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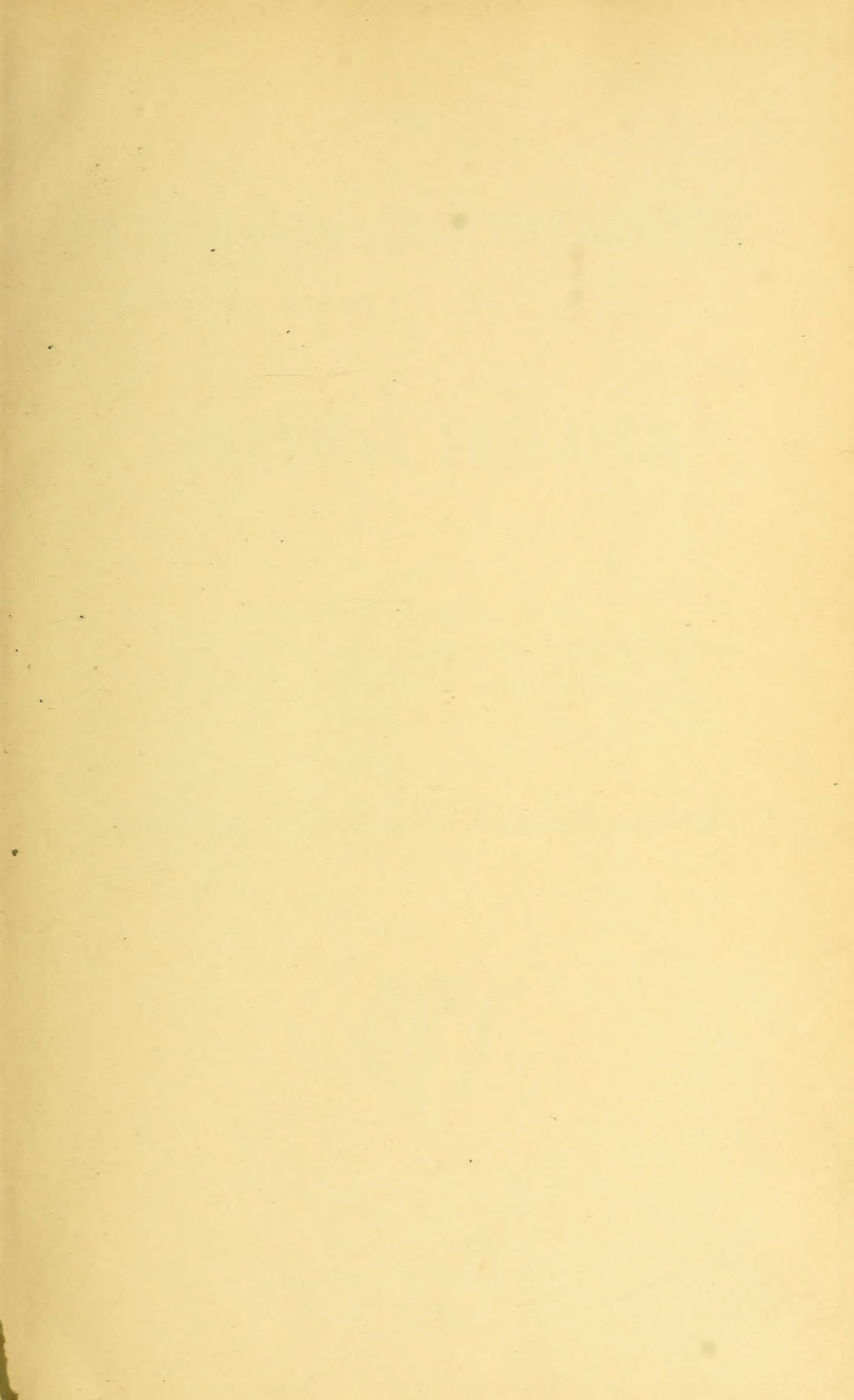


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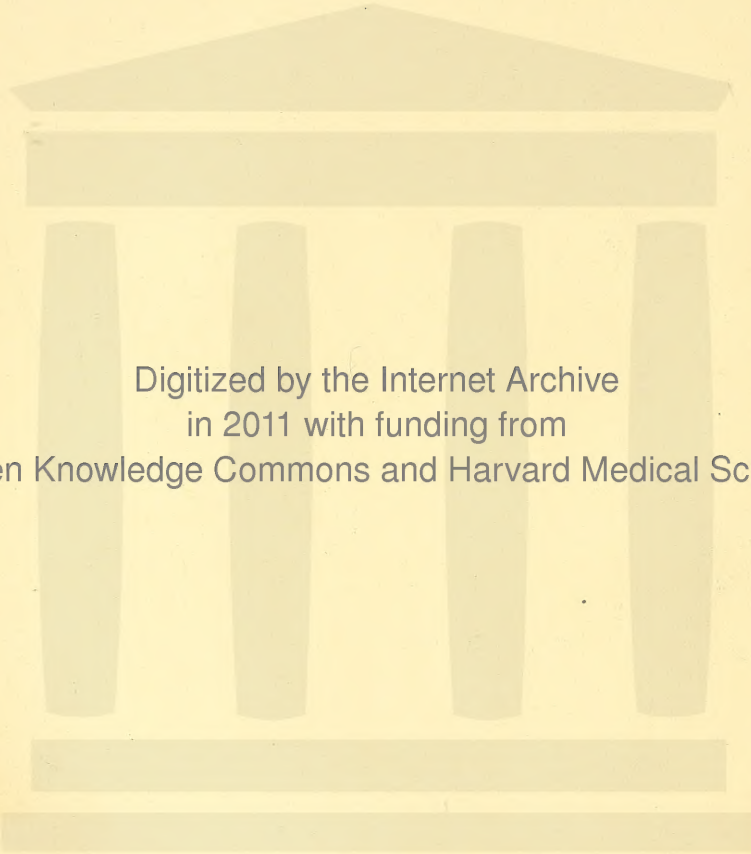












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THE  
PATHOLOGY AND TREATMENT  
OF  
VENEREAL DISEASES.

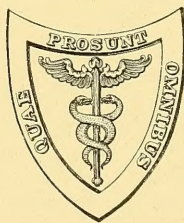
BY  
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WITH TWO HUNDRED AND THIRTY ILLUSTRATIONS AND SEVEN COLORED PLATES.

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TO

JAMES W. McLANE, A.M., M.D.,

DEAN OF THE FACULTY AND PROFESSOR OF OBSTETRICS AT THE COLLEGE  
OF PHYSICIANS AND SURGEONS, NEW YORK,

AS AN EXPRESSION OF HIGH REGARD,

THIS WORK IS DEDICATED BY

THE AUTHOR.





## PREFACE.

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IN preparing this volume the endeavor has been made to present the subjects herein considered on a level with our advanced knowledge of to-day. So vast is the mass of accumulated knowledge regarding venereal diseases, their sequelæ, and allied conditions, that no one man's experience can cover the whole ground. Consequently, the author who would offer to the profession an acceptable text-book on these subjects must supplement his own studies and observations by the experience of all observers whose works show inherent evidence of truth and progress, and he must deduce therefrom, in a thoroughly scientific and conservative spirit, the essential facts and the concrete knowledge thus far obtained.

The advancement made in the study of the nature and treatment of Gonorrhœa up to the present time is so great that its portrayal really amounts to a revelation. The pathology of this disease will be found to be very thoroughly considered, the various chapters being based on my own studies, supplemented and supported by the labors of many zealous and intelligent men. An attempt has been made to determine the pathological scope and the limitations of the gonococcus as a cause of urethral suppuration, and to tone down the too far-reaching and absolute views of those who see nothing beyond this virulent microbe. The treatment of gonorrhœa in all its stages and forms has been exhaustively considered, and it is hoped that the methods recommended will be found to be rational, safe, and effective. Much stress has been laid on the fads, the hobbies, and the visionary views held by many as to the therapeutics of gonorrhœa, and their fallacies, shortcomings, and dangers have been prominently brought forward. The sequelæ of gonorrhœa and their allied conditions have been duly considered. The subject of gonorrhœa in women, concerning which there is so much



doubt and obscurity, has been very fully considered, and it is hoped that the systematic chapter treating thereon may be of benefit.

Stricture of the urethra has received such careful and extended consideration as the importance of the subject demands. There is no morbid condition in the whole field of surgery concerning which the invaluable teachings of pathological anatomy have been so persistently neglected, resulting in errors and dangers which it has been my earnest effort to point out. Much space has been devoted to the treatment of urethral stricture, which has been rendered necessary by the prevalent but unscientific tendency to cut a urethra in which the slightest symptom of inflammatory change is detected. On this subject it is hoped the reader will find sound conservative statements as to what should and what should not be done.

The various genito-urinary affections included in this volume receive proper attention, and for them the latest surgical procedures are advised.

In the section on Chancroid the subject of etiology is fully considered, together with all questions and conditions relating to this hybrid ulcer, which in other days was a bone of contention in the medical mind.

So extensive has been the accumulation of facts relating to Syphilis that the subject has called for extended consideration. Its pathology, its position among general infectious diseases, its far-reaching tendencies, its various symbioses and relations to surgical pathology and to other diseases and conditions, have received especial attention, while its lesions proper have been fully but succinctly described. In the matter of the treatment of syphilis the effort has been made to consider the subject exhaustively, to point out the fallacies and dangers of several methods now more or less in use, and to lay down on broad lines certain directions for a general methodical treatment which are the outcome of prolonged experience and are founded on a solid scientific basis.

Hereditary syphilis has received due consideration.

The chapter on Syphilitic Affections of the Ear has been written by that accomplished specialist, my friend Dr. J. A. Andrews.

Much care and attention have been given to the matter of illustrating various morbid conditions, and with two or three exceptions all the illustrations contained in this volume have been made under my personal supervision, selected from a vast number of typical cases that have been in my care.

In so large an undertaking as the preparation of this volume one must of necessity sometimes seek aid of others, and it affords me pleasure to make this acknowledgment of my obligations. To Prof. George S. Huntington of the College of Physicians and Surgeons, New York, I am indebted for many courtesies extended to me in his anatomical laboratory; to Dr. Ira Van Gieson for aid in some pathological questions; and to Dr. J. R. Hayden for several good offices.

In presenting this volume to the profession I venture to hope that it may find the same favor which was accorded to the works written by my eminent and lamented colleague, Dr. Bumstead, and myself, of which the treatise on Venereal Diseases passed through five editions.

ROBERT W. TAYLOR.

40 WEST 21ST STREET, New York,  
September 12, 1895.





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# VENEREAL DISEASES.

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## INTRODUCTION.

IN the light of our present knowledge it may be stated that there are three distinct forms of venereal disease—namely, gonorrhœa, the chancroid, and syphilis. Although there are yet many unsettled points relating to all these diseases, the broad fact remains that they are, in essence, etiologically distinct. To-day our knowledge of the nature of gonorrhœa is tolerably clear and full, and we know far more than we knew in years gone by of the pathology of that virulent process.

Though there are many essential facts lacking for a thoroughly scientific knowledge of the chancroidal ulcer, much has of late been learned concerning its origin and pathogeny. Nothing in medicine is to-day better demonstrated than that chancroid and syphilis are entirely distinct morbid processes. Syphilis has a distinct virus of its own; chancroid has no essential virus, and may arise *de novo* independently of contagion, and may be produced by the inoculation of the products of simple inflammation.

It is unnecessary to devote very much space and time to a consideration of the history of the venereal disease, since with the expansion of our knowledge in recent years many of the old issues have been removed and explained, so that to-day the subject can be presented in a very compact form. To this end I shall touch lightly upon old issues and consider fully all the new ones.

## HISTORY OF THE VENEREAL DISEASE.

There is no fact more clearly established than that gonorrhœa existed among all nations and peoples in the earliest times. It is referred to by Moses in the fifteenth chapter of Leviticus, and, although it seems probable that the disease was not as common among the Greeks and Romans as among the Hebrews, there is unquestionable evidence that these nations suffered from it. Herodotus<sup>1</sup> states that the Scythians having pillaged the temple of Venus Urania, that angry goddess sent upon them and their posterity the woman's disease, which is characterized by a running from the penis. Those attacked were looked upon as accursed. Later writings by authors of all nations and of all ages clearly show that gonorrhœa and its complications were well known to them.

### The Chancroid.

Nearly all the Greek, Latin, and Arabian writers on medicine describe a contagious ulcer of the genitals which was called caroli

<sup>1</sup> *Clio*, lib. 1.



taroli, caries pudendorum, robigo, or cancer, and undoubtedly identical with our chancre. Celsus is particularly explicit in describing the simple phagedenic and seriginous chancre, and Hippocrates gives minute directions for the treatment of abscesses in the groin dependent upon ulcerations of the womb and of the genitals.

The history of the chancre in early ages is tolerably well made out, and we find that the views concerning it remained clear till toward the end of the fifteenth century, when it became confounded with syphilis.

### Syphilis.

It is absolutely impossible to say whether syphilis existed in remote antiquity or whether it first appeared and affected mankind toward the end of the fifteenth century. During the past twenty years many articles and books have been published with the intent of proving that syphilis was observed among many nations at the very earliest periods of the world's history. But an unprejudiced study of these contributions fails to carry conviction to my mind. Many plausible and seemingly convincing statements are made, but critical analysis of them shows so many misconstructions, so many mistranslations, and in fact so many distortions of fact, that one cannot but remain unconvinced.

Two orders of proof are offered as to the antiquity of origin or prehistoric existence of syphilis: the one is the evidence of certain diseased bones; the second, the description of certain lesions of the genitals, the ganglia, the skin, the mucous membranes, and the viscera. The evidence of these ancient bones makes out a very lame case. It is asserted that certain swellings, atrophic conditions, and curvatures are undoubtedly due to syphilis, acquired or hereditary. The statements are magisterially made, and little other than plausible reasons in explanation of the osseous lesions are given. There are no facts to prove that these pathological relics are not the result of tuberculosis, leprosy, rickets, rheumatism, gout, osteomyelitis, traumatism, and of simple inflammatory processes. In truth, the only scientific fact in our possession is that demonstrated by my friend Dr. J. N. Hyde,<sup>1</sup> and that is of an unanswerably negative character. At the suggestion of Dr. Hyde a morbid and ancient tibia which had been sent to him from Colorado as an example of the ravages of prehistoric syphilis was submitted to that eminent pathologist, Dr. T. M. Prudden, for microscopical study, and was pronounced by him to be an example of rarefying osteitis, a simple inflammatory process. Therefore, until it is scientifically demonstrated to us that certain undoubtedly very ancient and prehistoric bones (and their great antiquity must be substantially proved) present unmistakable evidence of having been the seat of true syphilitic processes, the contention that these fossil remains indicate a very early existence of syphilis is void.

The most elaborate recent attempt to prove the antiquity of syphilis is the work of Dr. Buret,<sup>2</sup> and besides this there have been many other shorter essays. Buret claims that syphilis existed five thousand years

<sup>1</sup> "A Contribution to the Study of Pre-Columbian Syphilis in America," *Am. Journ. Med. Science*, Aug., 1891.

<sup>2</sup> *La Syphilis aujourd'hui et chez les Anciens*, Paris, 1890.

ago among the Chinese, among the Japanese, the Egyptians, the Assyrians, the Babylonians, and the Hebrews. He explains every quotation of ancient writings in the light most favorable to his own views, distorts the meaning, and in several instances offers positive mis-translations. Any wart, ulcer, skin eruption, or affection of the genitals is regarded by him as evidence of syphilis, and every ill alluded to in the Scriptures or in the classics which can be tortured into being construed as eruptive is incontinently set down by him as proving his theory.

We do not find in classical writings any allusion or statement which seems to indicate syphilis. Petronius certainly would have revelled in the opportunity of picturing Trimalchio as suffering from the ravages of the *morbis Gallicus*, and how much could the picture of Quartilla and her associates be heightened by the description of a sunken nose, of the corona Veneris, total alopecia, or by some other hideous disfigurement! Nor do Horace and Juvenal, as we might expect them to do, make allusion to any ravages of syphilis, and the former certainly had a fine field in describing in his ode to an old woman, in addition to her many repulsive qualities, a gruesome picture of syphilis of the face. Dr. Buret quotes many passages from Martial, but he fails utterly in clearly proving that that vigorous epigrammatist of Roman morals knew anything about syphilis.

So that it may be stated without fear of contradiction that there is no absolutely clear authentic statement, record, or collection of facts thus far adduced which will carry enough weight with it to convince an unbiassed student that syphilis existed prior to the close of the fifteenth century. Littré's statement, then, still stands uncontroverted: "*On ne rencontre aucune indication précise de la syphilis proprement dite dans les médecins de la Grèce et de Rome et cela jette le doute sur ce point d'histoire médicale.*" And, further, Lancereaux's contention still holds good. He says: "*C'est en vain qu'on cherche dans antiquité une exposition dogmatique de la syphilis, elle ne s'y rencontre pas.*"

The first authentic account of syphilis is given by medical writers about the end of the fifteenth and the beginning of the sixteenth century. These writers, who were familiar with the chancroidal ulcer, describe syphilis as the *morbis Gallicus* and the *morbis novus et inauditus*. They recognized the initial lesion and described its physical qualities, particularly its hardness. Its venereal origin was soon definitely settled, and the fact that it was the forerunner of constitutional syphilis is clearly brought out in their detailed and graphic descriptions of the evolution of the disease.<sup>1</sup> The virulence of this terrible disease caused horror and amazement, for in this famous epidemic none seemed to be spared. Men, women, and children of high and low degree were

<sup>1</sup> Jacobus Cutaneus, in his *Tractatus de Morbo Gallico*, 1504, writes: "Anno Virginei partus millesimo quadragentisimo nonagesimo quarto, invadente Carolo Octavo, Francorum Rege, Regnum Parthenopæum, Alexandro Vero, Sexto ea tempestate summum pontificatum gerente, exortus est in Italia monstrosus morbus, nullis ante seculis visus totoque in orbe terrarum."

For the history of the origin of syphilis in the Middle Ages the reader is referred to Geigel, *Geschichte, Pathologie, und Therapie der Syphilis*, Würzburg, 1867; Auspitz, *Die Lehren vom Syphilitischen contagium*, Wien, 1866; and Proksch, *Die Geschichte des Venerischen Krankheiten*, Bonn, 1895.

attacked. The disease, in the language of a poet of that period, is said to have "neither spared the crown nor the cross."

The epidemic of syphilis which stands out so boldly in medical history occurred about the time (the latter part of the year 1494) when Charles VIII., king of France, with a large army invaded Italy with the intent of taking possession of the kingdom of Naples, which he claimed by right of inheritance. Charles left Rome on his way to Naples January 28, and reached the latter city February 21, 1495. After a time the Neapolitans revolted against the authority of Charles, and, aided by a Spanish army under the command of Gonsalvo of Cordova, they endeavored to drive the French out of Italy. There were then three armies encamped near Naples, and about this time the fearful epidemic broke out. It is not definitely established that the disease first appeared among the troops, but they certainly were attacked, and were one of the means of conveying the disease into other countries. There is ample evidence to prove that within a few years the disease had spread over the greater part of Europe. Thus we find that syphilis was by the Neapolitans called the *morbus Gallicus*, by the French *mal de Naples*, and was also called the Polish, Spanish, Turkish, and Christian disease. It was also named after some saints, and was called the disease of the holy man Job, of St. Leonard, St. Clement, St. Mevius, and St. Roche. It was not known as the American disease until twenty years after the return of Columbus from his first trip (1493). A writer named Oviedo, long after the death of that great navigator, by means of far-fetched arguments and distortions of facts tried to prove that his sailors became infected with syphilis from the Indians in America, and that they carried the disease to Europe. Oviedo and his statements and claims are really unworthy of historical chronicle.

It seems strange—and it is certainly unparalleled—that such a strikingly well-marked disease as syphilis should thus break forth in epidemic form within a quite restricted area of territory, and that its nature and origin should be wholly unknown to all observers and writers (and very many of them were learned and experienced men) of that period. Yet the fact remains that it was unknown in Europe prior to the last decade of the fifteenth century.

Those physicians who had been familiar with the chancroid and gonorrhœa prior to the year 1494 had very clear ideas as to their nature, and they knew perfectly well that they were not in any way related to the new disease. Consequently, early in the sixteenth century there was no confusion as to the nature of any of these diseases. As time went on, however, the men who witnessed the famous epidemic died, and in a few years what is known as the "age of confusion" in venereal diseases appeared. Then syphilis, chancroid, and gonorrhœa came to be regarded as one disease, having one origin, and was known as the venereal disease—*lues Venerea*.

The above-mentioned confusion, with the resulting indiscriminate mode of treating these diseases, existed unabated until toward the close of the last century, and did not wholly cease until the first half of the present century had been passed.

The identity of gonorrhœa with syphilis was, however, denied even



in the last century by Astruc,<sup>1</sup> Balfour,<sup>2</sup> and Benjamin Bell.<sup>3</sup> It was believed in by Hunter, but met with further opponents in Swediaur,<sup>4</sup> Hernandez,<sup>5</sup> and especially Ricord,<sup>6</sup> who by the use of the speculum in venereal diseases, by means of experimental inoculations, and his discovery of the *chancre larvé*, refuted the chief arguments which had been adduced in its favor, and established the non-identity of the two diseases beyond dispute for ever. This was the first great step out of darkness into light.

The idea that all venereal sores are due to a single virus, the virus of syphilis, had been the prevailing one for nearly three centuries prior to the year 1852. At the same time, it had not escaped the notice of many observers that the results of infection were by no means identical—that in some cases the persons infected showed no symptoms after the healing of their ulcers, while others developed a train of symptoms lasting through years, and even transmissible to their children.

In the year 1852, Bassereau<sup>7</sup> claimed a distinct cause or origin for each of these two classes of cases. He founded his claim, first, on the history of venereal sores, which we have already referred to, and which shows that although contagious ulcers of the genital organs, communicated in sexual intercourse, had been well known to the ancients, yet that the constitutional disease which we call syphilis made its appearance in Europe in the latter part of the fifteenth century.

Bassereau's second argument was based upon the "confrontation" of persons affected with venereal diseases, and he and others were able to prove in several hundred cases that when the disease was local in the giver it was also local in the recipient, and that when it was constitutional in the giver it was always constitutional in the recipient; in other words, that the broad line of distinction separating a local disease on the one hand from a constitutional disease on the other was constant in successive generations without limit.

It will be observed that this proof does not involve any differences, real or supposed, in venereal ulcers themselves; it may be said to rise above such consideration in that it ascends to the source and origin of such sores.

Though to Bassereau is certainly due the credit (which was even conceded by Ricord) of sharply distinguishing the non-identity of syphilis with chancroid, yet it is evident in the writings of the latter<sup>8</sup> that he was convinced that the hard and the soft sores were entirely different in nature and in origin. Ricord comes so near in some passages, particularly in his nineteenth letter, saying what Bassereau afterward proclaimed as a doctrine, that it is surprising that the whole truth did not flash through his mind, for he says that syphilis is absolutely inseparable from the indurated ulcer. Undoubtedly, the master gave his disciple the clue which he worked out so successfully and

<sup>1</sup> *De morbis venereis*, Paris, 1740.

<sup>2</sup> *Dissert. de gonorrhœa virulenta*, Edinburgh, 1767.

<sup>3</sup> *Treatise on Gon. Virulenta and Lues Venerea*, Edinburgh, 1793.

<sup>4</sup> *Traité complet des Maladies vénériennes*, Paris, 1801.

<sup>5</sup> *Essai analytique sur la Non-identité des Virus gonorrhéique et syphilitique*, Toulon, 1812.

<sup>6</sup> *Traité pratique des Maladies vénériennes*, Paris, 1838.

<sup>7</sup> *Traité des Affections de la Peau symptomatiques de la Syphilis*, Paris, 1852.

<sup>8</sup> "Lettres sur la Syphilis," *L'Union médicale*, 1850-51, and Paris, 1852.

clearly. Ricord was fully convinced that antecedent constitutional conditions, temperament, bad food, alcoholics, bad hygiene, and intercurrent diseases had not, as was claimed, any influence in causing a hard chancre in one man and a soft one in another. He saw, though he does not specifically say so, that the two lesions were due to two distinct causes.

Bassereau's lucid separation of the chancroid from syphilis was the second step in the era of light.

Unfortunately for medical science, this doctrine, so modestly put forward by Bassereau, was not allowed to rest in its clearness and simplicity. Clerc, also a disciple of Ricord, while he recognized the clinical distinctions between the initial lesion of syphilis and the chancroid, put forward the claim that in essence they were related. Clerc's thesis<sup>1</sup> was that the simple non-infective chancre is the result of the inoculation of the secretion of an infecting chancre upon a subject who has or who has had syphilis, and that it is the analogue of varioloid or false vaccinia; hence, that the term "chancroid" should be given to it. This much may be said, that while Clerc's theory has not been accepted, his name—chancroid—for the soft non-infecting sore is the best that we have.

Until the time of Bassereau's essay the doctrine of unicism held sway in venereal diseases; that is, that syphilis and the soft sore were alike in nature and origin. To the minds of many Bassereau's modest statement of facts was not radical enough; so Rollet<sup>2</sup> of Lyons and others set themselves to the task of proving that the chancroid was the expression of a distinct, special virus, and as a result they put forward the doctrine of dualism in syphilis, the essence of which was that syphilis originated in its own virus, and that the chancroid was also the expression of a distinct virus. The stability of this doctrine depended upon the sharpness and precision in distinguishing these two poisons and their results. It was very easy to present clearly-cut lines of differential diagnosis between the two kinds of sores, but when the advocates of dualism made the claim that the chancroid was peculiar in the fact that the tissues of the head were immune to it, and advanced the tenet (which was vital to their theory) that the secretion of syphilitic lesions could not be (as were those of the chancroid) inoculated with success upon the person bearing them or any syphilitic individual, they exposed themselves to attacks which have since demolished their main theory. There were, therefore, four principal contentions and many minor ones now unnecessary to consider in the doctrine of dualism: 1st, that the chancroid, like syphilis, was due to a specific, special virus; 2d, that this virus never originated *de novo*, but was handed down in generations, each sore propagating only its own kind; 3d, that syphilitic secretions produced hard chancres about the head and face, which parts were unaffected by chancroidal pus; and 4th, that the pus of chancroids was also inoculable, while the secretions of syphilitic sores were not. These tenets were very soon vigorously attacked. The claim that the tissues of the head and face possessed an immunity against the action of chan-

<sup>1</sup> "Du Chancroïde syphilitique," *Extrait du Moniteur des Hôpitaux*, 1854.

<sup>2</sup> "De la Pluralité des Maladies vénériennes," *Gaz. méd. de Lyon*, No. 3, 1860; *Recherches cliniques et expérimentales sur la Syphilis, le Chancre simple, et la Blennorrhagie*, 1861; and *Traité des Maladies vénériennes*, Paris, 1865.

croidal pus, while they readily reacted under the influence of syphilitic secretions, was soon demolished by the publication of cases in which true chancroids were found upon these parts. The main points of attack of the antagonists of dualism were—first, that each sore, hard and soft, propagated only its own kind; second, that the soft sore always originates in one of its own species. The first blow delivered by the antagonists of this doctrine was the fact brought out by the experiments of Clerc, Melchoir Robert,<sup>1</sup> and others, who succeeded in inoculating the secretion of syphilitic sores on their bearers, with the result of producing ulcers without an incubation period which presented all the characteristics of the chancroid and were inoculable in successive generations. Then, following up this line of attack, Henry Lee,<sup>2</sup> Köbner,<sup>3</sup> and Pick<sup>4</sup> clearly proved that the secretion of a true chancre could become purulent and auto-inoculable when irritated by any agent or means (powdered savin, tartar emetic, setons, etc.). This fact was also proved by Boeck, Bidentkap, and Gjör in their experiments in syphilization. These early observers had at their command only clinical observation and experimental inoculations. They made no use of the microscope, and in those days it would have profited them nothing. To-day we know that the syphilitic chancre, when kept clean and un-irritated, gives issue only to serum or sero-mucus. If it is irritated, as it usually is by the deposition of dirt of many kinds, it gives issue to pus which contains pyogenic microbes, which pus will produce chancroidal ulcers on its bearer and on the non-infected.

If the early disputants on the doctrines of unicism and dualism had only known that pus-producing micro-organisms were at the bottom of all the changes in the irritated hard chancre, and that their presence in either is accidental or the result of their own blundering manipulations, their controversy would have been short-lived. The unicists at once claimed that the results of these various experiments, above mentioned, confirmed their doctrine and demolished that of the dualists. The experiments in reality proved that the chancroid might originate *de novo*. They certainly do not prove a common origin for the hard and the soft sore.

To defend itself, the dualistic school then took refuge in the doctrine of the "mixed chancre," a sore combining both the syphilitic and chancroidal poisons, which, it was asserted, would satisfactorily explain all these cases and still leave the tenets of dualism, as at that time understood, intact. This explanation was for a while regarded as satisfactory, but it could no longer be upheld when such experiments had been multiplied indefinitely; when their number was so great that the chance of the commingling of two kinds of specific virus in their simultaneous inoculation was reduced to an absurdity; when an indurated syphilitic primary lesion could be taken at random, and, after due irritation, its secretion could be successfully inoculated, with the effect of

<sup>1</sup> *Nouveau Traité des Maladies vénériennes*, Paris, 1853 and 1861, pp. 306 et seq.

<sup>2</sup> *Brit. and Foreign Med.-Chir. Review*, vol. xxiii., April, 1859, pp. 496 et seq., and *Lancet*, 1856, 1859, 1860, and 1861.

<sup>3</sup> *Klin. und Experiment. Mittheilungen aus der Dermatologie und Syphilidologie*, Erlangen, 1864, pp. 70 et seq.

<sup>4</sup> Auspitz, *op. cit.*, pp. 335 et seq.



producing pustules and ulcers bearing every characteristic of the chancroid; and when the same result could even be obtained at will by the inoculation of the secretion from a purely secondary lesion, as, for instance, a syphilitic mucous patch. If the chancroid was dependent upon a distinct specific virus, its presence in all these cases was simply impossible, and yet not a single shade of difference could be pointed out between the result produced and that from the most emblematic chancroid ever met with in practice. Dualism was indeed henceforth dead, if by "dualism" be meant that each of the two kinds of venereal sore has a *distinct, specific* virus of its own.

A mixed chancre is simply an accident, and is by no means a uniform pathological process. Any hard chancre may be attacked by pus-microbes and its general appearances much changed. There is, then, the same aggregated mass of specific syphilitic cells which has become the seat of ulcerative action.

But the last word had not been spoken in favor of a distinct origin of the chancroid from that of syphilis, nor the last experiment made and recorded which would decide this question. Let us examine more carefully the experiments just referred to. What was the matter so successfully inoculated? The pure, unmixed virus of syphilis? By no means. It was a compound product, taken, to be sure, from a syphilitic lesion, but a lesion irritated commonly to suppuration by artificial means, containing possibly the germ of syphilis, but containing also, and in fact chiefly composed of, *pus*, which we know to-day contains pyogenic micro-organisms. Which of these two factors was responsible for the effect produced? The syphilitic virus? In that case this virus should have preserved its power of infecting the constitution, and matter taken from these ulcers and inoculated upon healthy individuals should have invariably produced syphilis, which has been shown not to be true. Moreover, if it could be proved that pus alone, free from all suspicion of syphilitic mixture, was capable of producing the same result, then *pus* was the pathogenic factor. This idea opened up a new line of attack, led mainly by Pick, Reder, and Kraus.

In 1865, Pick, at the suggestion of Zeissl,<sup>1</sup> inoculated simple, non-venereal pus of inflammatory origin upon syphilitic subjects. Taking the secretion of pemphigus, acne, scabies, ecthyma, and lupus, he inoculated it upon persons affected with syphilis and produced pustules not preceded by incubation, and the matter of which was further inoculable through several generations. Counter-inoculations upon the persons free from syphilis who were the bearers of these affections were without effect. The same result was attained by Kraus and Reder<sup>2</sup> with the pus of scabies, and by Henry Lee<sup>3</sup> with pus from a non-syphilitic child. The late Mr. Morgan<sup>4</sup> of Dublin also succeeded in producing pustules and ulcers identical in appearance with the chancroid, and capable of reinoculation through a number of generations by inoculating syphilitic women with their vaginal secretions.

It is unnecessary to further amplify this subject, for to-day there is no fact more clearly proved in medicine than that pus applied to the

<sup>1</sup> *Lehrbuch der Syphilis*, Stuttgart, 3d ed., 1875, pp. 180 et seq.

<sup>2</sup> *Pathologie und Therapie der Venerischen Krankheiten*, Wien, 1868, pp. 25 et seq.

<sup>3</sup> *Op. cit.*

<sup>4</sup> *Practical Lessons in Contagious Diseases*, London, 1872.



skin, particularly of those actively attacked by syphilis, will produce suppurative dermatitis. The evidence offered by cases of ecthyma and impetigo contagiosa proves very conclusively that these diseases are due to pus-implantation.

What is thus far in our study proved by scientific investigations is, that the secretions of irritated syphilitic lesions, primary and secondary, when inoculated on persons suffering more or less from active syphilis produce pustules and ulcers absolutely like chancroids in all their characteristics and attributes. The fact that the skin and the mucous membranes in early—and sometimes in late—syphilis are peculiarly susceptible to irritation and inflammation is undoubtedly the underlying factor in this pyogenic process.

Thus far, it will be seen that the inoculations had only been made upon syphilitic subjects, and the burning question which then arose was: What effect had this pus, experimentally produced on a syphilitic, when inoculated upon a non-syphilitic subject? To prove that this same inoculation was possible on non-syphilitics without the transmission of syphilitic infection to them was then the crucial point in the controversy. Strange as it may seem, the necessary evidence presented itself by mere chance in the experience of men who were not working in this direction. The following observations by Boeck, Danielssen, Bidentkap, and Gjör paved the way to a correct understanding of this obscure point:

Boeck<sup>1</sup> in 1856 treated a non-syphilitic woman suffering from chronic eczema rebellious to all forms of treatment by means of repeated inoculations with the irritated secretion of hard chancres. The woman was benefited, and was not rendered syphilitic. Five years afterward this treatment was again employed on the same woman at the hands of Dr. Bidentkap, who took matter from a typical hard chancre which had been irritated. The result was the production of pustules, but syphilis was not transmitted.

Danielssen's<sup>2</sup> observation is still more striking: A man thirty years old, free from syphilis, was inoculated three hundred and ninety-three times with pus derived from irritated hard chancres, and was not rendered syphilitic. Later on he was inoculated directly with the natural secretion of a hard chancre, and became the victim of syphilis.

Bidentkap's<sup>3</sup> case is also very convincing. It was that of a non-syphilitic woman suffering from gonorrhœa, who inoculated herself with the pus derived through several generations from an initial syphilitic lesion, with the result of producing a sore identical with a chancroid, the secretion of which was accidentally auto-inoculated with success. At this time the woman was not infected with syphilis, but a year and a half later she became infected.

Gjör's cases, communicated in writing to Dr. Bumstead, offer important cumulative evidence. Gjör was practising the now obsolete method of treating syphilis by syphilization, which consisted in the continuous inoculation of the patient with virus derived from irritated early syphi-

<sup>1</sup> *Récherches sur la Syphilis*, Christiania, 1862, p. 68b. This is the case usually attributed to Bidentkap, who experimented on it under Boeck's direction.

<sup>2</sup> *Die Syphilisation in ihre Anwendung gegen Syphilis und Spedalsked*, 1858. This case was also reported by Dr. Gjör, *Deutsche klinik*, 1858, 33.

<sup>3</sup> *Om det syphilitiske Virus*, Christiania, 1863, and *Wien. med. Wochenschrift*, 1865, No. 34.

litic lesions. The cases now detailed became inoculated with pus derived from irritated mucous patches. The first case was that of a girl twenty-five years old, free from syphilis and under treatment for some simple affection. She stealthily procured some of the pus and inoculated herself, with the result of producing chancroid-like pustules. She has never presented any symptoms of syphilis.

The second case was that of a girl aged nineteen, free from syphilis, who inoculated herself in a similar manner with a similar result. For several months after this experience she was kept under observation, but showed no signs of syphilis. A year and a half later she contracted a true chancre in sexual intercourse, which was followed by secondary manifestations. The third case was that of a girl eighteen years old, who followed the examples of the two preceding girls and produced chancroids, but was not infected with syphilis.

These observations and experiments warrant the following conclusions:

1. That irritation of syphilitic lesions, particularly the early ones, gives rise to an actively destructive form of pus which by auto-inoculation produces ulcers identical in all characteristics and attributes with chancroids.

2. That this pus inoculated upon subjects virgin to syphilis produces ulcers unmistakably chancroidal and inoculable in generations like chancroids.

3. That this form of pus, though very irritating and destructive, does not contain the germ of syphilis.

Clear and convincing as this evidence is, it can be urged against it that it is experimental and not clinical. It was my good fortune early in 1870 to observe an undoubted and incontrovertible case in which chancroids were contracted by a non-syphilitic woman from irritated lesions resembling chancroids in her syphilitic husband. This man, syphilitic in 1869, came in March, 1870, with a papular syphilide and acute gonorrhœa. A few days later he came with a group of unruptured herpetic vesicles on the under surface of the prepuce near the frænum. He had not had coitus in three weeks. During the week following his gonorrhœa remained active, and at the end of that time I found that the herpetic vesicles presented the appearance of oval, absolutely typical chancroids. A few days later his gonorrhœa, being on the decline, while intoxicated he had connection with his wife, who ten days later came to me with five or six large typical chancroids on the fourchette and inner aspect of the labia minora. The wife also was careless, and her chancroids became large and deep and gave rise to a typical bubo. The husband also had a chancroidal bubo. Two years later the woman contracted syphilis from a lover. Here, then, is a case of a man suffering from active syphilis who had undoubted herpetic vesicles, which, owing to contamination with pus-microbes, become converted into true chancroids, which chancroids gave rise to similar lesions in his wife. This clinical observation, very carefully made and duly noted, confirms in every particular the results of experimental inoculation. During the past twenty years I have seen several cases of chancroids in men which have been traced to purulent and muco-purulent genital discharges in women in the secondary stage of syphilis. It can be safely asserted that

any observer may obtain similar results if he will take the pains to follow up to their origin a series of cases of chancroid in the male. I have also seen chancroids in the female which had been contracted from men whose hard chancres in their period of decline had become irritated, and then resembled chancroids.

Thus far we have seen that the chancroid may become developed *de novo* from the secretion of irritated syphilitic lesions both in syphilitic and virgin subjects. It has also been shown that pus taken from healthy persons and inoculated upon syphilitic subjects has produced pustules and ulcers in all particulars like chancroids. Thus far, however, although it has been shown that the chancroid may originate *de novo*, the inoculations have been upon syphilitic subjects by means of their own irritated secretions, or these secretions have been inoculated upon healthy persons. The case, therefore, cannot be considered complete, and the doctrine of dualism effectually destroyed, until we have cut adrift wholly from syphilis, and have proved that pus from non-syphilitic subjects may be inoculated on its bearers or other healthy subjects, and that from such inoculations ulcerations similar to chancroids have been produced.

Though the inoculability of many forms of pus is well known and generally conceded, it is best to give here the evidence as it has thus far been presented in its bearings upon the doctrine of dualism. The first experiments are those of Dr. E. Wigglesworth<sup>1</sup> of Boston, made in 1867-68 upon himself. He, being free from all disease and only a little run down from over-study, took pus from an acne-pustule upon himself and inoculated his arm. The result was the development of well-marked pustules which were successfully inoculated in three generations. On the removal of the crusts perceptible ulceration of the skin was seen. Wigglesworth then made the claim, which has since been substantiated, that the products of simple inflammation if properly introduced into the skin will cause local ulcers resembling chancroids.

Next in importance are the results obtained by Vidal<sup>2</sup> in 1846 and again in 1852, which, while they amply proved (at a time when this subject was enveloped in doubt and obscurity) that simple non-specific pus was auto-inoculable upon its bearer, had much influence upon the trend of thought in this direction. Vidal inoculated ecthymatous pus upon its bearers, who also suffered with typhoid fever: the result was the development of pustules identical with those from whence they were derived.

Kaposi's<sup>3</sup> testimony has also had much weight in determining the exact nature of the chancroid. He says: "My own experiments have taught me that non-specific pus, such as that from acne and scabies pustules, when inoculated upon the bearers, as well as upon other non-syphilitic persons, will produce pustules whose pus proves to be continuously inoculable in generations."

Further evidence is given by Tantarri,<sup>4</sup> who by inoculations of pus

<sup>1</sup> Written communication to Dr. Bumstead.

<sup>2</sup> "Inoculabilité des Pustules d'Ecthyma," *Annales de Dermat. et de Syphiligraph.*, 1872 and 1873, vol. iv. pp. 350 et seq.

<sup>3</sup> *Die Syphilis der Haut und der ungrenzenden Schleimhäute*, p. 47, Wien, 1873.

<sup>4</sup> "Sull' eterogenia dell' ulcera non-sifilitica," *Giornale Ital. delle Malat. Vener. e della Pelle*, vol. ix. 1874, pp. 257 et seq.



from various sources succeeded in producing characteristic ulcers. These experiments of Wigglesworth, Kaposi, and Tanturri, taken in connection with those previously detailed, are of the greatest value, and they certainly warrant the conclusion that ulcers similar to the chancroid may be produced by the products of simple inflammation. Something more, however, was needed to clinch the matter, and this has been supplied by the very convincing experiments of Finger.<sup>1</sup> This observer took for his subject a woman suffering from leucorrhœa and eczema. These affections were cured; the uterine and vaginal secretions were then demonstrated to be innocuous, and it was established beyond doubt that the woman was not suffering from chancroids. Further than this, there had not been a case of chancroid in the hospital for several weeks. Every care was exercised that no contamination of the woman from without could occur. Finger then with the curette irritated the posterior vulvar commissure, and without cleansing or bandaging the parts he put the woman to bed. Inoculations with the scant secretion of this erosion were unsuccessful. Then Finger smeared the lesion over with powdered savin. On the following day there was an abundance of true pus, from which a series of successful inoculations were made upon the patient's thighs, which were further followed by an inflammatory bubo in the groin. A man was successfully inoculated with the pus from the woman's thighs. Four more cases were experimented upon in like manner, with similar results.

The teachings of these cases are particularly striking in the fact that the suppurative process was developed upon the genitals, and that with the pus thus obtained ulcers in all respects like chancroids were produced. These observations are supported by facts observed by Tommasoli<sup>2</sup> in clinical practice. Tommasoli had under his care a man who did not contract chancroids in coitus, and was not exposed to any infection. He simply suffered from severe balanitis, which was further complicated by the development of vegetations in the coronal sulcus. As a result of these combined inflammatory conditions a purulent discharge was established which gave rise to ulcers identical with chancroids, from which inoculable pus was obtained.

In the section on the etiology of chancroid as presented in clinical practice many cases corroborative of Tommasoli will be found.

At this late day it may seem almost unnecessary to follow the foregoing series of cases in their full detail, since they only prove what is so generally known and conceded, that pus rich in pyogenic microbes is promptly and freely inoculable and auto-inoculable. But even now there are physicians (usually those who have failed to acquaint themselves with all the facts involved in the battle between the unicists and the dualists) who have vague ideas as to the nature of the chancroid, and who prefer to look upon it as an occult and mysterious ulcer rather

<sup>1</sup> "Ueber die Natur des Weichen Schankers" (*Vierteljahr. für Derm. und Syph.*, 1885, pp. 670 et seq.) and "Zur Frage über die Natur des Weichen Schankers und die Infectiosität tertiärer syphilisprodukte" (*Allg. Wien. Med. Zeitung*, 1887, Nos. 9, 10, 11, 13, 14, and 15).

<sup>2</sup> "Beitrag zur Kenntniss des Weichen Schankers," *Allg. Wien. Med. Zeitung*, 1886, vol. xxxi. p. 351.



than as one whose origin is clearly known, and which at best is a hybrid affair, an ordinary septic ulcer of the genitals.

Carefully reviewing and weighing all the foregoing facts, we are warranted in stating *that while the chancroid may be—and very commonly is—derived from a previous chancroid, a chancroidal bubo, or chancroidal lymphangitis, it may also originate in the pus derived from irritated lesions of syphilis and from irritated simple lesions in syphilitic subjects, and also in simple pus, particularly when originating in active or intensely irritated lesions.*

With this disposal of the question of the essential virulence of chancroid, the assertion which is loudly proclaimed by some, that “if all the patients in the world with chancroid would avoid contact with others until their malady got well, the disease would cease from off the face of the earth,” is at least amusing.

Experimental studies in pus-inoculation show that the intensity of the destructive action of the secretion depends largely on the degree of irritation to which the producing lesion is subjected, and that its unknown quality, which has wrongly been called “a special specific virus,” is really due to that. Pathology further teaches that the activity of the pus resides in the vast number of microbes proliferated and in the toxins which they give rise to. A common-sense view of the course of these destructive ulcers of the genitals does away with the necessity of assuming a subtle virulent action as being possessed by them. Of all parts of the human frame, the genital organs are those most prone to irritation. In them the circulation in capillaries and sinuses is very abundant. They are the seat of frequently-recurring congestions with or without coitus, and are largely under the control of the mental emotions. Their conformation is such that unless kept continually and scrupulously clean inflammations are sure to occur. What wonder, then, that ulceration is severe upon these exuberant regions!

Syphilis is a virulent disease; chancroid is a hybrid, heterogeneous lesion, a septic ulcer, and in many cases an active form of wound-infection.

The unicists would have been right if they had claimed a special virus for syphilis only, but they erred in attributing a similar origin to the chancroid.

The dualists were warranted in asserting that there is a specific syphilitic virus, but the reader can judge from what has been presented in the foregoing pages how much importance he shall attach to their claim that there is a special specific virus for the chancroid.

It may be mentioned, as a matter of history, that gonorrhœa was relegated to the plane of a catarrhal process by Ricord when he demonstrated its non-identity and non-relationship to syphilis. It is no longer necessary to burden the mind with the points brought out by the advocates of the catarrhal origin of gonorrhœa against the claim of the virulists that it was a virulent process, since to-day it is clearly proved that the contention of the latter is correct.



## PART I.

# GONORRHŒA AND ITS COMPLICATIONS.

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### CHAPTER I.

#### ANATOMY AND PHYSIOLOGY OF THE PENIS, THE URETHRA, THE BLADDER, THE PROSTATE, AND ACCESSORY PARTS.

FOR a thorough knowledge of gonorrhœa and its complications and sequelæ a clear general understanding of the anatomy and physiology of the genito-urinary tract is necessary.

The penis is a pendulous organ consisting of root, body, and glans, and through it three-fourths of the urethra runs. It is the organ of copulation and of urination, and is composed of two parallel cylindrical bodies called the corpora cavernosa, which, lying side by side, have a groove on their under surface in which is situated the corpus spongiosum. These cylindrical bodies, with connective tissues, vessels, nerves, and lymphatics, together with the tegumentary investment-sheath, form the penis.

Each corpus cavernosum has a dense, quite thick, but very elastic fibrous investment, from which thin processes or trabeculæ pass inwardly and form cavities which are filled with erectile tissue. The inner surface of each cavernous body is thick and complete in the proximal part of the penis; consequently, there is at that part a distinct septum formed by the fusion of these two inner surfaces. More anteriorly or distally there are only a number of vertical bands of fibrous tissue arranged like the teeth of a comb, and hence called the *septum pectiniforme*. It is important to bear in mind the structure and relations of the cavernous bodies, as well as of the spongy body, in operations on the penile urethra. The corpus spongiosum also consists of a firm, fibrous sheath, from which trabecular processes pass inward and form meshes which contain erectile tissue. In the outer coat of the corpus spongiosum is a thin layer of circular muscular fibres continuous with those of the bladder. A second layer of longitudinal muscular fibres is situated between the inner surface of the corpus spongiosum and the mucous membrane of the urethra.

The corpora cavernosa constitute the chief bulk of the penis, and each one begins in a tapering portion, the *crus penis*, which is attached along a groove in the rami of the ischium and os pubis. They are further attached to the symphysis pubis by a strong elastic suspensory ligament, the base of which is fused in their fibrous tissue and the apex is inserted into the symphysis. Converging together at once at the root

of the penis, these cylindrical bodies run parallel side by side, and each ends in a bluntly-rounded extremity which fits in a depression in the base of the glans penis.

The corpus spongiosum surrounds the urethra from the triangular ligament to the meatus urinarius. It begins in the centre of the perineum in an expanded form called the bulb, which rests directly on the anterior surface of the triangular ligament. It then runs under the corpora cavernosa in the groove left for it, like a ramrod under a double-barrelled gun, and ends in an expanded extremity, the glans penis, the apex of which corresponds to the meatus.

The glans penis is therefore the expanded distal portion of the corpus spongiosum, while the bulb is its proximal expanded portion. The glans is an obtusely-conical, acorn-shaped body, somewhat flattened on its upper surface, and ending in a rounded, expanded portion called the corona, which rounds off abruptly and projects like a collar beyond the body of the penis proper, and behind it is seen when the prepuce is retracted a nearly circular groove called the coronal sulcus, the balanopreputial furrow, and the cervix. A little below the centre of the apex is the vertical slit-like opening of the urethra, called the meatus. The under surface of the glans is flat and triangular in shape, the apex of which usually ends at the inferior commissure of the meatus, and into it the frænum of the prepuce is inserted. The integument of the penis forms an investing sheath which retains its tubular form in the normal condition up to a little beyond the extremity of the glans penis. Then it is reflected or folds on itself, backward, in the form of a mucous membrane, and is inserted by gradual merging into the whole length of the coronal sulcus. It is then reflected forward over the glans, to which it is firmly adherent, and ends at or a little within the orifice of the meatus, with the mucous membrane of which it is continuous. Thus it is that for a short distance (one-quarter to one inch or more) the mucous membrane of the urethra consists of squamous or pavement epithelium.

The fact of the firm adherence of the mucous membrane to the glans and of the absence of loose connective tissue explains why hard chancre of this part are not much indurated, and why chancroids are slow in their destructive action. That portion of the under surface of the prepuce which is in the median line becomes transformed into a fibrous band which is called the frænum preputii, and which, as we have seen, is inserted just under the lower part of the meatus urinarius. The prepuce, therefore, consists of two layers—the outer one integumentary and continuous with the skin of the penis, and the inner or reflected one formed of mucous membrane, which is covered with stratified pavement epithelium, which extends, as already stated, into the meatus for a varying distance.

The integument of the penis is very thin and extensible, and very readily movable over the cavernous and spongy bodies by means of a very delicate, loose, and abundant connective tissue destitute of fat-cells.

The integument of the penis is plentifully supplied with sebaceous and hair-follicles, which frequently become the seat of inflammatory processes and of new growths (milia and wens).

In the normal condition the prepuce, or foreskin, forms a tube of quite uniform calibre, which is loose and roomy and readily admits of



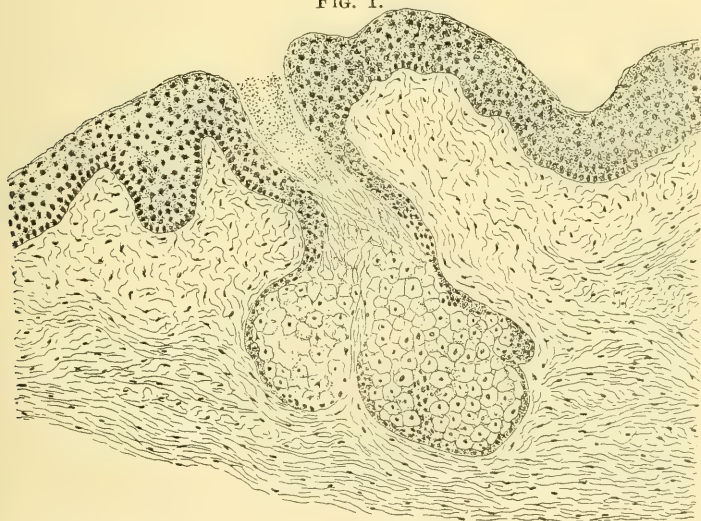
its retraction and replacement over the glans penis. Usually it ends at or just beyond the meatus. In some cases, however, it is redundant and extends more or less beyond the end of the penis. Then, again, it may be short, so as only to cover a portion of the glans, and in quite exceptional cases in the adult there is no prepuce at all. In this event it has happened that as the penis developed the integumentary layer did not correspondingly increase.

Sometimes the preputial orifice is very small, so that it will with difficulty allow the glans to emerge through it. Then, again, this contraction may be so great that only a pin-sized aperture is seen, in which event retraction is impossible and very little of the glans or meatus can be seen. In some cases the calibre of the prepuce is decidedly too small for its easy retraction, and it then may exert injurious pressure upon the glans. In other cases the frænum is too short (and it is then usually a rather thick cord), and by the contraction which it exerts upon the prepuce some deformity results. These conditions are shown in the chapter on Phimosis.

The penis is cylindrical when flaccid, triangular in shape when turgid, and therefore has three sides with corresponding rounded margins. The dorsal flat surface is broader than the lateral surfaces.

It is widely stated that the mucous layer of the prepuce normally contains minute sebaceous glands called by old writers *glandulæ Tysoni odoriferæ*. This, however, is erroneous. Whenever present, Tyson's glands are situated externally on the penis, and are distributed along the corona glandis in the sulcus and on the reflection of the prepuce and near the frænum. In young children these glands are fairly numer-

FIG. 1.



Showing a section through one of Tyson's glands in the prepuce of a young child.

ous, but in adults they are much more difficult to find, as they seem to become atrophied to a large extent. Tyson's glands are identical in every respect in structure to the sebaceous glands of the skin or scalp.

They consist of two or more bag-like acini lying just beneath the epidermis, which open into a common duct, and the whole cellular lining of the duct and the gland is continuous with the epithelium of the skin. (See Fig. 1.)

Von Düring<sup>1</sup> has made an exhaustive study of the microscopical anatomy of the preputial mucosa, and he claims that it contains no glandular structures whatever, but that there are minute inversions or invaginations of the mucous membrane in the form of diverticula, and longer and narrower ones found near the frænum, which he calls cysternæ frænuli. The so-called glands are therefore simply reduplicatures or invaginations of the membrane in the form of minute shallow or deep crypts.

Von Düring's conclusions have been confirmed by investigations made for me by Dr. Van Gieson. Certain clinical and pathological observations, however, seem to show that occasionally one or more Tyson's glands persist in later life. (See p. 193.)

Preputial smegma, that whitish coating of cheesy odor, is therefore simply effete epithelium, perhaps formed in the crypts or on the mucous membrane itself.

The meatus is normally a constricted part of the urethra. In structure it varies more or less in different individuals. In some its vertical lips are thin and coapt with each other like the leaves of a book, forming a not prominent vertical slit. In other cases the lips are more or less rounded and the meatus has a rather expanded, pouting appearance. Then, again, owing to the fact that the mucous membrane is rather redundant and loose, its lips sometimes have an uneven, somewhat mammillated appearance. In some very rare cases the mucous membrane forms a cylinder of a line, or even a third of an inch, in length beyond the apex of the glans, constituting a membranous extension of the urethra to which my friend Dr. Otis<sup>2</sup> applies the term "fusiform meatus." In somewhat rare cases a thin septum is seen to extend horizontally across from one lip to the other, seemingly dividing the meatus into two parts. Separation of the lips, however, shows that this septum simply forms a blind pocket which may be shallow or rather deep. In this condition the narrowing of the meatus is at its superior portion, and therefore the surgical indication here is to relieve the trouble by cutting toward the roof of the urethra, while in almost all other cases the rule is to cut toward its floor.

In somewhat exceptional cases the meatus is very small, even of pin-head size. In this case it will generally be found, by passing the tip of a probe inward and downward, that the abnormal smallness of the calibre is due to the fusion of the mucous membrane at the lower commissure.

While a full consideration of the malformations of the meatus and glans (which belong to the domain of general surgery) is not germane to this work, it is well to mention, in a general way, that there may be more or less absence of the floor of the urethra in its glandular portion, in which case the urethral orifice is a small, round, or a transverse, slit-like hole. This condition is called hypospadias.

<sup>1</sup> "Beiträge zur Anatomie des Penis," *Monatshefte für Prakt. Dermatologie*, vol. vii. pp. 1117 et seq., 1888.

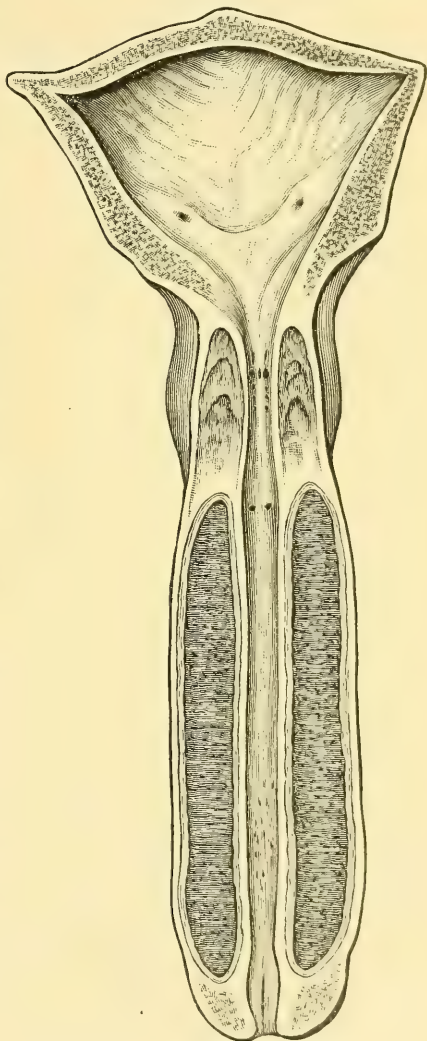
<sup>2</sup> *The Male Urethra*, p. 10, Detroit, 1888.

The seat of the urethral orifice or meatus is sometimes found higher up on the dorsum of the glans, and in one case I found that the urethra at the base of the glans turned upward quite abruptly and ended in a well-marked slit seated in the middle line of the coronal eminence. Absence of the distal part of the upper wall of the urethra is called *epispadias*.

The male urethra is a slit-like canal, regarded by some as a closed valve, which extends from the bladder to the meatus urinarius. It is the vent-pipe for the urine and gives issue to the seminal fluid. It therefore has two functions, which must be kept in mind in order that its diseases may be clearly understood. It is in direct relation with the kidneys, the ureters, and the bladder, and may be the means of transmitting disease to these organs of the urinary system, or it, in turn, may become diseased by the extension of pathological processes from these organs and structures. Then, again, pathological processes attacking the urethra may extend to all or to certain portions of the genital system—namely, the testicles, the vasa deferentia, the seminal vesicles, and the prostate and its crypts and follicles. In its turn the urethra may be involved by the extension of disease from either of these structures and appendages, with which it is in direct anatomical relation. If the function of the urethra were simply that of transmitting the urine, a length of about two inches would be sufficient, as it is in the female, but, being also a part of the genital apparatus, its length is necessarily much increased for purposes of intromission and fecundation of the female. This increase in length, as we have seen, is due to the existence of the cavernous and spongy bodies.

The urethra is composed of three layers—a mucous layer, a submucous connective-tissue layer, and a muscular layer. Its walls are always in contact, except during the passage of urine and semen, a period of three or four minutes during the day. The average length of the urethra is from seven to

FIG. 2.



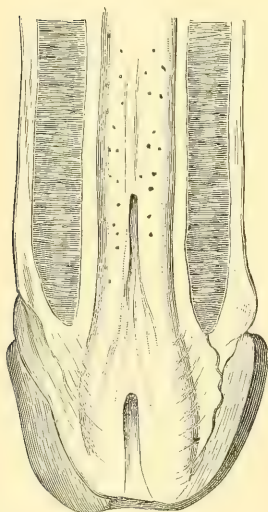
Showing the normal urethra opened longitudinally on its upper surface.



eight and a half inches, but it may be shorter or longer. It is increased in length during erection and in hypertrophy of the prostate.

When the urethra is split longitudinally in its whole extent on its upper surface, its course, with its varying expansions, comes into view. (See Fig. 2.) At the meatus urinarius we find a normal narrowing of the canal, which then expands into a spindle-shaped portion which is called the fossa navicularis; hence this is called the navicular portion of the urethra. As this part emerges into the spongy or penile portion a slight constriction occurs. The canal then expands, and we find it of somewhat uniform calibre in its course through the corpus spongiosum for a distance of four or five inches. It then expands again, in conformity with the bulbous expansion of the corpus spongiosum, and a spindle-shaped canal is formed, which is from an inch to an inch and a half in length, and which is called the sinus of the bulb or the bulbous portion of the urethra. Again becoming contracted at the anterior layer of the triangular ligament, it has a uniform calibre for a distance of about three-quarters of an inch, when, at the posterior layer of this ligament, it emerges to expand again into the prostatic urethra. In its course through the triangular ligament it is simply a membranous canal seated about an inch beneath the summit of the pubic arch and surrounded by the compressor urethræ muscle. The prostatic urethra is the direct continuation of the membranous urethra. It also has a spindle shape, and is about an inch and a quarter in length. (See Fig. 2.) Thus, anatomically, there is a navicular, a spongy, a bulbous, a membranous, and a prostatic portion of the urethra, making five divisions in all. The term "penile," or pendulous, urethra is also applied to that portion which extends from the glans to the peno-scrotal angle.

FIG. 3.



Section of the urethra slit up on its lower wall, showing the lacuna magna and a deeper, valve-like pocket and the orifice of numerous mucous glands.

Clinically, in a general way, we speak of the anterior and posterior urethra, the former extending to the anterior layer of the triangular ligament, and the latter including the portion beyond.

The mucous membrane of the urethra is smooth and shining and of a yellowish-pink color, which is deeper at the first inch and at the bulbous portion. For a short distance—one-fourth to one inch within the meatus—the membrane is covered with flat pavement epithelium; beyond that part it is of the columnar variety as far as the vesical orifice. With the naked eye we observe, particularly on its upper wall, certain valve- or pocket-like reduplications of the mucous membrane, which are called lacunæ. Generally there is but one large one, which is seated on the upper wall of the navicular portion of the urethra, one-half to three-quarters of an inch from the meatus. This structure is called the *lacuna magna*, and is well shown

in Fig. 3. There may be, exceptionally, several of these valve-like struc-

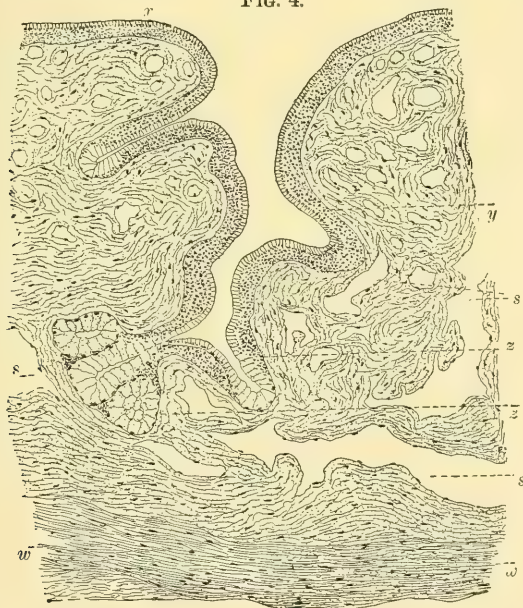


tures, which, however, are not, as a rule, found deeper than three inches from the meatus. In Fig. 3 a second lacuna is portrayed, about an inch and a half beyond the lacuna magna.

With the naked eye—or, better, with the aid of a pocket-lens—a number, sometimes large, of minute pits or openings may be seen, particularly on the upper wall of the urethra, for a distance of three or more inches. These are the orifices of the mucous follicles or glands of the urethra. Though they are generally found on the upper, they are sometimes seen on the lower, wall, as shown in Fig. 2, which was drawn from nature. These glands are usually not very closely grouped together, being separated from each other by about three or four millimetres, and the excretory duct appears as a tiny pit about one-half millimetre in diameter. If a flap of urethral mucous membrane is dissected up, these follicles can be seen in the submucous connective tissue in the shape of very minute yellowish masses.

The mucous glands of the urethra are said to be the *follicles* or *glands of Littre* and the *lacunæ* or *crypts of Morgagni*, but there is a general lack of directness of statement on the subject, and our knowledge is therefore not precise. The truth is, that the crypts of Morgagni are nothing but the glands or follicles of Littre, which have an unusually tortuous or wide-mouthed duct, and structurally they are simply mucous glands which are a trifle larger or more prominent macroscopically than the remainder of the glands.

FIG. 4.



One of the mucous glands, or glands of Littre, opening into the lumen of the urethra; *x, y*, lateral branches of the main duct with their more superficially-situated acini; *z, z*, continuation of the main duct with deeply-situated acini; *s, s*, sinuses of the cavernous tissue; *w, w*, tunica albuginea.

In structure these glands or follicles follow the type of the compound racemose gland (Fig. 4). The duct divides into one or more branches

which pass directly into a cluster of two or three or more acini lined with cylindrical epithelium like that lining the ordinary mucous glands, as of the trachea or duodenum. As a rule, the main duct divides into one or more secondary branches. In Fig. 4, for example, there are in the particular plane of the section three branches of the main duct, each becoming continuous with a cluster of a rather limited number of terminal acini. The epithelium of the urethra passes over into the mouths of the ducts and lines them almost down to the junction with the acini. While the branches of the main duct pass off laterally and more or less parallel to the surface of the urethra, the main duct passes

FIG. 5.



Section of the urethra on its lower wall, showing the upper wall, with bristles passed into the ducts of mucous glands.

down more vertically, deep into the cavernous tissue of the urethra; consequently some of the gland-acini, as those of the branches *x*, *y* in Fig. 4, are quite superficially situated, while the acini belonging to the main duct lie very deep, sometimes almost reaching down to the tunica albuginea (Fig. 4, *z*).

The lacuna magna is a large, tortuous mucous gland which opens into the apex of the valve-like reduplication of the urethral mucous membrane just at the posterior limit of the fossa navicularis. In structure all these valve-like pockets are the same. The ducts of the follicles or glands pursue a more or less oblique course, directed forward toward the meatus. This condition is well shown in Fig. 5. When the urethra is collapsed the mouths of the ducts generally open into the bottom of the folds or creases into which the urethral lumen is thrown. If the urethra is distended or stretched out flat (as was the case in Fig. 4), the relation of the ducts of the glands to the surface of the urethra becomes much plainer.

One point of practical importance in reference to these mucous glands, as will be shown later on, is the considerable involvement of their mouths and deeply-situated ducts by the extension of the inflammation in acute, and especially in chronic, gonorrhoea. Another important point to be remembered is, that in passing large and particularly small instruments through the urethra it is necessary to hug the lower wall in order that the point of the instrument may not be caught in the various pockets and follicular orifices. A glance at Fig. 5 will make these points very evident to the mind. This figure shows the upper wall of the urethra, in which are very many quite patulous ducts of mucous glands into which bristles have been passed. It will be seen that the course of the duct outlet is obliquely outward toward the meatus.

The male urethra is best studied by tracing its course from the bladder toward the meatus. The relations between the urethra, the

bladder, and the prostate are so intimate that a knowledge of these organs is essential.

The bladder is the musculo-membranous reservoir for the urine, and is seated in the pelvis behind the pubes and in front of the rectum. When empty and contracted it is a small triangular sac deeply seated in the pelvis. When distended it assumes a rounded form, partly fills the pelvis, and rises into the abdominal cavity. In many cases of retention of urine it is so distended that its apex reaches the umbilicus. Its vertical is greater than its lateral diameter, and its long axis is obliquely downward and backward, owing to the fact that it curves slightly toward the abdominal wall. The apex of the bladder is rounded and connected to the umbilicus by the urachus. The front of the body of the bladder is not covered with peritoneum, and is in relation with the triangular ligament, the symphysis pubis, and the internal obturator muscles.

The peritoneum is reflected from the anterior surface of the rectum to the lower and back part of the bladder about an inch distant from the base of the prostate and just behind the points where the ureters pass into the bladder. It, however, in some cases comes down as low as the base of the prostate. It then passes to the summit, and from there is reflected upon the abdominal wall. As a result of this arrangement the peritoneum sags down behind the pubes when the bladder is empty. As the viscus becomes distended its base extends toward the perineum and its summit comes in contact with the abdominal walls. As it rises in the abdomen the prevesical peritoneal covering of the bladder gradually forms a pouch which, when the organ is much distended, and particularly when the base of the bladder is elevated by a distended rubber bag in the rectum, becomes more and more elevated above the pubes, and leaves a space of two or three inches of the anterior wall of the bladder free from peritoneum. This arrangement of the anterior bladder-wall and of the peritoneum must be borne in mind in the operations of aspiration and of suprapubic cystotomy.

It is also necessary to be familiar with the space between the pubes and the anterior wall of the bladder, called the prevesical space or the cavity of Retzius. This cavity is pyramidal in shape, and is formed by the oblique position of the bladder as it tilts forward toward the abdominal wall. The prevesical space is formed by the transversalis fascia, which divides into two layers just above the pubes, the anterior layer passing down behind the pubes and there becoming merged, while the posterior one passes over and behind the bladder, merging with the pelvic fascia. Thus there is a triangular space formed, the apex of which corresponds with the line of the fusion of the fascia above the pubes, while the base of it is behind the pubes. In this space more or less fatty tissue and blood-vessels are found, and it is through it that the incision is carried in the suprapubic operation.

The mucous membrane of the bladder is of a pale yellowish-red or pale rose color, and is covered by flat polyhedral epithelium, underneath which are club-shaped and spindle-shaped cells. It has a few follicles, and some small racemose glands lined with columnar epithelium near its neck, which are seated in the submucous connective-tissue coat.

When the bladder is opened on its anterior surface, together with the upper wall of the prostate, it is seen to be thrown into folds or rugæ,



which for the most part pass horizontally around the viscus. Other rugæ run longitudinally and obliquely, and as a result the membrane is divided up into more or less square and irregular flat eminences. This queer appearance is due to the contraction of the muscular fibres acting upon the mucous membrane and its submucous coat. It gradually disappears when the bladder becomes distended. When in health the bladder is examined by means of the cystoscope, the membrane is seen to be smooth and of light pink, sometimes with a yellowish tinge. It follows from what has been said that the mucous coat of the bladder is loosely attached to the muscular coats. This is the case in its whole extent except at its base. At this part we find the trigone or triangular space, which is bounded on each side by a slight but well-marked ridge which corresponds with the position of the muscles of the ureters. These ridges begin and form the apex of the trigone near the vesical orifice and uvula vesicæ, and run outward and backward about two inches. At its base the trigone is about two inches wide, and at each angle of it the orifice of a ureter opens into the bladder. From apex to base the trigone is about one and a half inches in length. The mucous membrane of the trigone is of pale color, smooth, never wrinkled, and firmly attached to the parts beneath. (See Fig. 2.) That portion of the bladder situated just behind the trigone is called the post-trigonal space, and is of great surgical interest in the matter of pouches, stones, and tumors.

The prostate gland is situated at the neck of the bladder, and is a firm body having the shape of a horse-chestnut or truncated cone, its base corresponding with the vesical orifice and its apex being continuous with the membranous urethra and deep perineal fascia.

The prostate gland encloses the first part of the urethra. Its upper surface is about three-quarters of an inch below the pubic arch and about an inch behind it. Its base is about two and a half inches from the anus, while its apex is about one inch and a half from that orifice. It is formed of glandular tissue which consists of an aggregation of mucous follicles similar to those of the anterior urethra, which form about one-third of the whole structure. In addition to this there is a compact mass of unstriped muscular fibres arranged in varying directions, transverse, longitudinal, and oblique, which, together with connective tissue, elastic fibres, vessels, lymphatics, and nerves, form the body of the gland. The prostate therefore is a musculo-glandular body capable of much dilatability. It is covered by two sheaths or capsules, the external one, of firm fibrous structure, being a reflection of the recto-vesical fascia, which merges into the deep perineal fascia at the apex of the gland. The inner or true capsule is a thin but firm structure composed of muscular and connective tissues and elastic fibres, which are continuous with those of the parenchyma of the gland. A plexus of veins is found between the capsules of the prostate.

There are two lobes of the prostate which are always present, and these are called the lateral lobes. They are of equal size, and in many cases can be clearly made out by the tip of the finger in the rectum, which usually discovers a more or less superficial or deep groove or notch between them. In the healthy adult the width of the prostate as felt in the rectum is about an inch and a half, while its length is



about an inch or an inch and a half. In hypertrophy these measurements become greatly increased. As the two lobes merge behind, a pyramidal-shaped space is left on their upper surface, which is filled up by what is called the middle or third portion (wrongly called *lobe*) of the prostate. This part of the organ is particularly rich in glands, muscular tissue, and blood-vessels, and is the one most prone to hypertrophy after middle age. This middle portion lies behind the verumontanum, and is tunnelled by the two ejaculatory ducts. When this portion becomes of such size and extent as to constitute a true lobe, it is then a pathological growth and a decided obstruction to urination. It may form a well-marked bar at the entrance of the bladder, and it may be formed in the shape of a small round ball, which on urination is pushed over the urethral orifice like a valve, producing more or less complete obstruction to urination. Dr. Measor<sup>1</sup> claims that in subjects over sixty years of age the middle lobe is enlarged in 20 per cent. In old age enlargement of the lateral lobes is sufficiently common. This enlargement may be concentric, in which case the calibre of the urethra is more or less lessened, or it may be in a longitudinal direction, in which event the length of the prostatic urethra is more or less increased.

We are now in a position to study the posterior urethra.

The posterior urethra includes the membranous and prostatic portions, and extends from the vesical orifice to the anterior layer of the triangular ligament.

The prostatic portion of the urethra extends from the apex to the base of the prostate, and is situated about one-third nearer the upper than the lower surface of the gland. (See Fig. 11.) In exceptional cases prostatic tissue is absent for a short distance on the roof of the urethra. This is compensated for by fibrous and elastic tissues which are merged with the sphincter. It is an inch and a quarter in length, but it may become much longer in cases of hypertrophy. The prostatic urethra, also called the neck of the bladder, is spindle-shaped and has a diameter of 30 F. at the apex, 45 in its middle portion, and 33 at its vesical end. This portion of the urethra contains some very important structures. On the floor is a narrow longitudinal ridge, the verumontanum, also called the caput gallinaginis, crista gallæ, or colliculus seminalis. This structure is composed of erectile tissue and muscular fibres, which during erection become turgid and prevent the passage of semen back into the bladder. It likewise temporarily prevents the passage of the urine. The verumontanum is continuous with the uvula vesicæ, and is eight or nine lines long and one and a half lines in height.

In the verumontanum and in the neighborhood of the prostatic orifices the tissues are richly supplied with nerves of peculiar sensibility, and it is here that the seat of the sense of pleasure in the sexual act is centred. It is here that inflammatory processes give rise to disturbances of the sexual function and to various painful sensations which may extend to parts beyond. When the seminal fluid is poured into the urethral canal mixed with the secretion of the seminal vesicles and with the prostatic fluid, it is prevented from passing backward by the verumontanum and uvula vesicæ; then the muscles of the gland powerfully contract and discharge it.

<sup>1</sup> *Med.-Chir. Trans. London*, vol. xliii., quoted by Holden in *Manual of Dissection*.

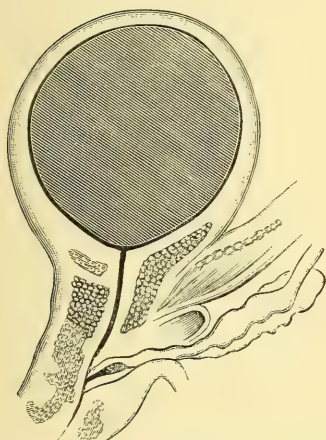
When one considers the complexity of structure of the posterior urethra with its multitude of crypts and follicles and its great vascularity, it can readily be seen why the gonorrhœal process becomes so firmly seated there.

On the summit of the verumontanum, sometimes at its fore part and sometimes about its middle, is a slit-like depression which leads to a *cul-de-sac*, or flask-shaped cavity, of about one to three-quarters of an inch in length, directed upward and backward. This is called the sinus pocularis, vesicula prostatica, and uterus masculinus from its homology with the female uterus. In its lips or vertical walls, and sometimes just on each side of it, are openings of the ejaculatory ducts. (See Fig. 2.) In some cases both of these ducts open into the sinus pocularis itself; in other cases only one duct is thus placed. On each side of the verumontanum is a slight depression which is called the prostatic sinus, and into these sinuses the twenty or thirty orifices of the prostatic ducts of the lateral lobes open. The ducts of the middle portion open behind the verumontanum. On section the prostatic urethra is like an inverted  $\nabla$ , thus— $\Lambda$ . When the bladder is empty its walls, contracted into a rounded or triangular mass, are in coaptation. At this time the lumen of the prostatic urethra is effaced by the contraction of the muscular fibres. The vesical end of the prostate is then in the form of a well-defined but not very resistant sphincter, which divides the urethra sharply from the bladder. As the viscus gradually fills the pressure of the accumulating water overcomes the tonicity of the internal sphincter. Dilatation of the prostatic urethra then begins, and as this progresses it gradually loses its spindle shape and becomes decidedly funnel-shaped and directly continuous with the bladder. Thus, when the bladder is empty the prostatic urethra is essentially its neck, but when it is quite fully distended the neck-like arrangement becomes lost and the bladder and prostatic urethra are continuous without any barrier between them. It follows from what has been said that the urethra proper is longer when the bladder is only slightly full than it is when it is quite fully distended. When the bladder is nearly empty it will be found that it is necessary to introduce the catheter nearly an inch farther than it is necessary to introduce it when it is full. The reason of this is obvious: with the bladder only slightly distended the internal sphincter is still contracted and the eye of the instrument must pass that part before urine is reached. Later on, when the sphincter is much dilated and the prostatic urethra is transformed into a funnel-shaped cavity continuous with the bladder, it is only necessary for the eye of the catheter to pass behind the external sphincter, when it encounters urine. Finger is certainly right in his claims on this subject.

In this connection it is necessary to more fully call attention to the two sphincters of the prostate. The internal prostatic sphincter is situated at the point of the junction of the prostate with the bladder, and is merged with the substance of the former. It is composed of smooth muscular tissue and elastic fibres arranged in the form of a ring, into the meshes of which muscular and elastic fibres from the bladder enter at right angles. The internal prostatic sphincter therefore contains no voluntary muscular fibres. The external prostatic or vesical sphincter is situated at the apex of the prostate, and is composed

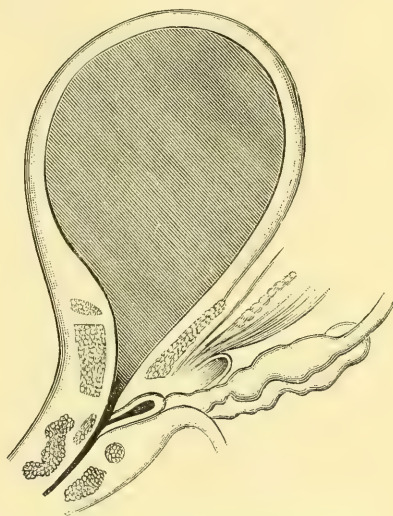
of smooth muscular fibres, together with a greater quantity of voluntary muscular fibres. The involuntary fibres are arranged in the form of a ring. The voluntary fibres at first (that is, in the portion toward the apex of the prostate) form a transverse band across the upper portion of the urethra, stretching from lobe to lobe. At the apex, however, they are quite numerous and form a distinct ring, which with the ring of involuntary fibres constitutes a very strong sphincter. It is this sphincter, when the bladder is full and the internal sphincter is much dilated and lost in the bladder-tissue, which remains firm, occludes the canal, and prevents the passage of the urine. The relation of the prostatic urethra and the sphincter to the bladder when empty and full is well shown in Figs. 6 and 7, which are modified from Finger's pictures.

FIG. 6.



Showing a partially-filled bladder separated from the prostatic urethra.

FIG. 7.



Bladder much distended and fused with the prostatic urethra, which is funnel-shaped.

In Fig. 6 the bladder is only partly full, and the well-defined vesical orifice is still intact by reason of the tonus of the internal sphincter. In Fig. 7 the bladder is much distended and the prostatic urethra is obliterated, of a funnel-shape, and merges directly with the bladder-cavity. In this case the external vesical or prostatic sphincter exerts its tonus and retains the urine.

The direction of the prostatic urethra, which is in a fixed position, is downward and forward until it reaches the posterior layer of the triangular ligament, when it becomes the membranous urethra, which pursues nearly the same direction with a slightly upward tendency.

The membranous urethra is from three-quarters to an inch in length and of a calibre of 27 F., and, owing to the fact that this segment of the canal forms a part of the subpubic curve of the urethra, its superior wall is somewhat shorter than the inferior wall. It is peculiar in the fact that it is composed wholly of mucous membrane with a submucous connective-tissue coat and some unstriped muscular fibres. It is the

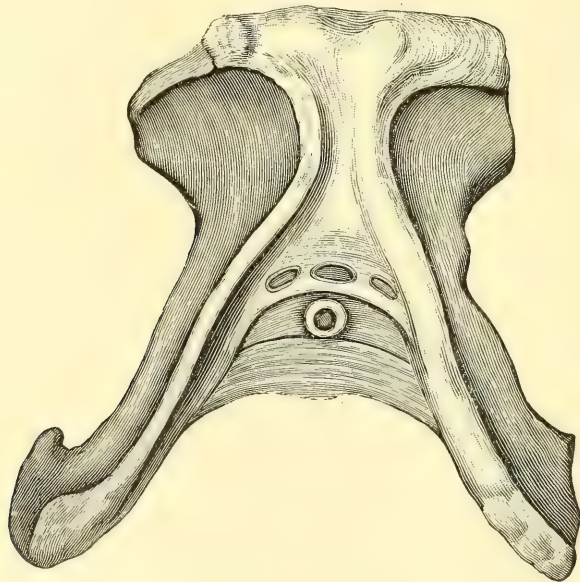


least vascular part of the urethral canal, and has very few mucous glands and crypts. By reason of its anatomical structure it is not so severely affected by the gonorrhœal process as the other portions are; consequently it is rarely, if ever, the seat of true stricture. When strictures are found in this region they are usually the result of traumatism. Indeed, traumatic strictures are usually found in the membranous and bulbous portions of the urethra, resulting from wounds and contusions of the perineum against the pubic arch.

The membranous urethra is situated and held in a fixed position between the two layers of the triangular ligament, a knowledge of which is essential.

The triangular ligament, which is a portion of deep perineal fascia, consists of two layers, an anterior and a posterior layer, between which is the compressor urethræ muscle. In Fig. 8 the anterior layer is shown as a dense fibrous membrane, stretching from the posterior lip of the os pubis and ischium, from which the crura of the penis have been dissected off. This anterior layer is about an inch and a half in length, and in accord with the direction of the pubic bone its base is directed backward. About an inch below the symphysis pubis is the urethral orifice, the external termination of the membranous urethra. Around this orifice, as shown in Fig. 8, the fibrous membrane is seen,

FIG. 8.



Showing the anterior layer of the triangular ligament and Henle's deep transverse ligament of the pelvis, with openings for vessels and nerves.

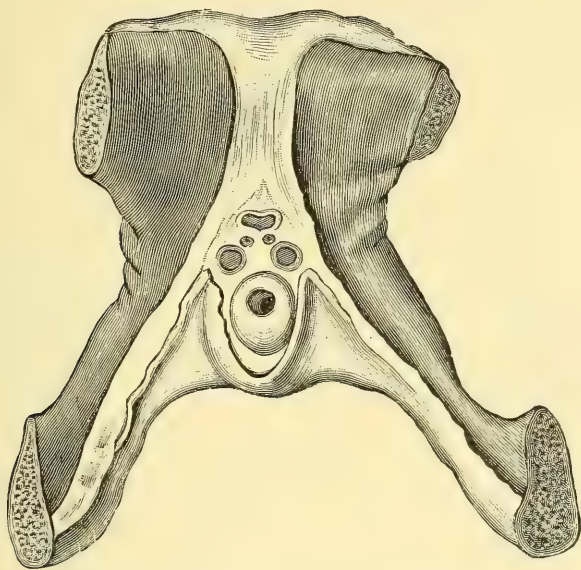
which is continued forward over the bulbous portion of the urethra. The triangular ligament extends upward toward the symphysis to a distance just above the hole for the urethra, and is shown in Fig. 8 as a curved line. Above that is the dense fibrous tissue called "Henle's deep transverse ligament of the pelvis," which is pierced by the open-



ings for the vessels and nerves. The triangular ligament and Henle's ligament therefore close this part of the pelvic outlet.

The posterior layer of the triangular ligament is derived from the obturator fascia, and from it a prolongation passes backward and forms the outer capsule of the prostate. Its upper portion, called Henle's ligament, is pierced by the opening for the *plexus venosus pubicus impar*, which consists of veins returning from the penis and of the dorsal arteries. The triangular ligament proper is pierced by the membranous urethra, as shown in Fig. 9, which also shows the apex of the

FIG. 9.



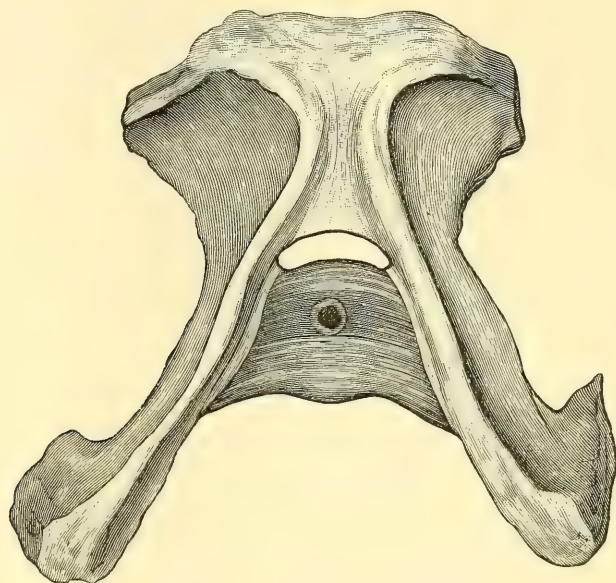
Showing the posterior layer of the triangular ligament.

prostate and the external prostatic sphincter blending with the membranous urethra.

When the anterior layer of the triangular ligament is dissected off, the compressor urethræ muscle is exposed in the form of a firm, flat muscular band, rather more than an inch wide, stretched between the pubic rami, but not wholly covering the pelvic outlet at its apex. (See Fig. 10.) This muscle, also called the constrictor urethræ, the cut-off muscle, is composed of transverse fibres of the striped variety, some of which pass directly over and some under the urethra, while others pass around and encircle it. This muscle is very powerful, and, being under the control of the will, it can at any time suddenly stop the flow of urine. Though the external prostatic sphincter consists of rings of unstriped muscular fibres at the apex of the prostate, the greater part of the true sphincteric action is performed by the compressor muscle. In the course of acute and chronic gonorrhœa, and during irritative processes in the prostate, seminal vesicles, and bladder, this muscle may undergo spasm and produce what is wrongly termed "spasmodic stricture." Under the influence of rough manipulation by instruments in

the urethra, of cold, and of very strong and irritating urethral injections, spasm may also be produced. Then, again, as a result of operations about the rectum, abdomen, lower limbs, etc., this muscle may be thrown into spasm and retention of urine may result. Some authors

FIG. 10.



Showing the compressor urethræ or cut-off muscle.

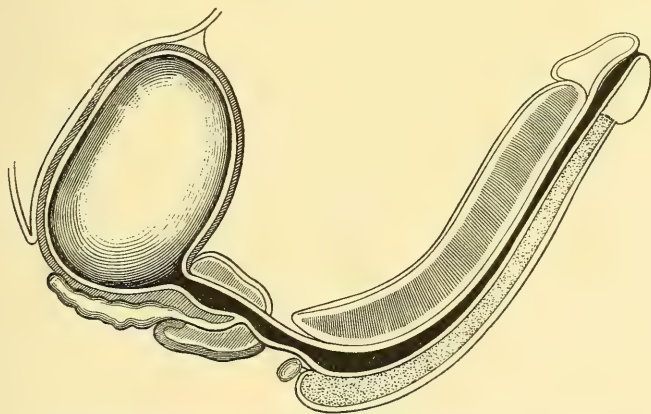
claim that this muscle is always in a state of rigid contraction or tonus, so that the lumen of the urethra is of the fineness of a hair, and that this contraction tends to prevent the extension of the gonorrhœal process from the anterior into the posterior urethra, and also acts as a dam, preventing secretions in the prostatic and membranous urethra escaping into the anterior urethra. This is far too sweeping a statement. When the bladder is more or less full the compressor or constrictor urethræ closes up the membranous urethra and prevents the escape of urine; but when the bladder is not full, even in cases of subacute inflammation in any part of the urethra, bulbous or prostatic, there is not in the majority of cases any unusual tonus or spasm of this muscle. This fact can be readily demonstrated, as I have done hundreds of times, by the gentle passage into the bladder of a soft catheter or bougie of a calibre of 12 or 14 French. This instrument, causing no irritation or nervous shock, glides easily first into the membranous urethra, then along the prostatic urethra into the bladder. The excessive tonus claimed to be peculiar to this muscle in general occurs when rigid instruments, particularly of large size and when not skilfully passed, are used, or when injections have been forcibly made. Then the nerves of the urethra are disturbed, and prompt reflex spasm of the muscle occurs. In the majority of persons the compressor muscle and the external prostatic sphincter keep the urethral canal mildly compressed. That is, its tonicity is such that the lumen of the canal is obliterated by the coaptation of the

folds of membrane, but there is no spasm. Consequently, it occurs, as a rule, that the secretions of the prostatic urethra are kept from escaping into the anterior urethra. Though this may be stated as the law, it has exceptions in some cases of acute posterior urethritis, in some of prostaticorrhœa, and in some of suppuration of the seminal vesicles. Though Finger and some other authors deny this occurrence, I am positive that it sometimes occurs.

When the bladder is only slightly full the internal prostatic sphincter is sufficiently competent to occlude the vesical orifice, and thus prevent the escape of urine into the prostatic urethra. As the fluid accumulates, however, such expansive pressure is exerted that the vesical sphincter gradually yields and allows the escape of urine into the prostatic urethra. For a time the external prostatic sphincter, which is stronger than the internal, is strong enough to keep the urine back, but when the bladder becomes very full the sphincteric action is performed by an effort of the will through the compressor urethræ muscle.

On each side of the membranous urethra, quite near to it and seated in the substance of the compressor muscle, are Cowper's glands. These glands are of pea size and of the compound racemose variety. From each one a duct three-quarters of an inch in length passes through the anterior layer of the triangular ligament and opens obliquely into the floor of the bulbous portion of the urethra near the median line. These glands secrete a mucous fluid during sexual excitement and coitus. They are interesting clinically as being sometimes the seat of gonorrhœal inflammation. (See Fig. 11.)

FIG. 11.



Showing the normal contractions and expansions of the urethra from the meatus to the bladder, with Cowper's gland opening by its duct into the bulbous urethra.

Lying just upon the anterior layer of the triangular ligament is the bulb of the corpus spongiosum, containing the bulbous expansion of the urethra. Here the membranous urethra ends, and the part is called the bulbo-membranous junction. The urethra enters the bulbous expansion nearer its upper than its lower half; consequently the pouch-like dilatation of the urethra is greater on its lower surface. It is this condition which sometimes causes trouble in the passage of sounds and



catheters, to obviate which it is necessary here to keep the point of the instrument toward the roof of the urethra, and to put the penis on stretch in order to efface the pouchy pocket as much as possible. As age advances the bulb frequently becomes more roomy and lax, and thus it often presents in old men greater obstacles to the passage of the catheter. The bulbous portion of the urethra or the sinus of the bulb is unusually vascular, and its tissues are soft and succulent. Consequently, the gonorrhœal process is often very acute and severe at this part, and the disease shows a tendency here to remain in a chronic condition. As a result we find the larger number of true strictures in this region.

The direction of the bulbous urethra is forward and upward, and its calibre is from 33 to 36 French. The downward and forward direction of the prostatic urethra and the slightly upward direction of the membranous urethra, with the decidedly upward direction of the bulbous urethra, form what is called the subpubic curve. Continuous outwardly with the bulbous portion of the urethra is the spongy penile or pendulous urethra. It, like the bulbous portion, is contained in the corpus spongiosum. It is from six to six and a half inches (sometimes more) in length, and is surrounded by erectile tissue. The mucous-membrane crypts and follicles of this portion of the urethra have already been described. The calibre of the penile or pendulous urethra is usually from 27 to 30 French, but it is often found to be greater than this measurement. The penile urethra is susceptible of considerable dilatability, but it must be remembered that the word "calibre" represents normal distention, such as is found by the moderately easy passage of instruments or by the stream of urine, while "dilatability" means a calibre produced by unusual or excessive distention of the canal by instruments.

The distal portion of the urethra seated in the glans penis is called the fossa navicularis, or the navicular portion of the urethra. It is of spindle shape, and at its middle portion its calibre is 30 to 33 F. At its point of junction with the penile urethra the calibre is from about 28 to 30 F. The calibre of the meatus, the terminal point of the urethra externally, is from 21 to 28 F.; exceptionally, however, it is greater. A schematic representation of the urethra with its normal contractions and expansions is given in Fig. 12.

To recapitulate:<sup>1</sup> The calibre of the urethra is not uniform, there being, as already shown, physiological contractions and dilatations. As a general average the following figures will be found to be correct:

Meatus, 7 to 9 m. m. . . . .	21 to 28 F.
Fossa navicularis, 10 to 11 m. m. . . . .	30 to 33 F.
Middle of pendulous portion, 9 to 10 m. m. . . . .	27 to 30 F.
Bulb, 11 to 12 m. m. . . . .	33 to 36 F.
Membranous urethra, 9 m. m. . . . .	27 F.
At apex of prostate, 10 m. m. . . . .	30 F.
Middle of prostate, 15 m. m. . . . .	45 F.
Vesical end of prostate, 11 m. m. . . . .	33 F.

<sup>1</sup> Dr. Otis (*Practical Clinical Lectures*, etc., 1883, pp. 441-442) states that there is a constant relation between the circumferential measurement of the flaccid penis and the calibre of the urethra in the healthy condition. He says: "When the circumference is 3 inches the urethra has a normal calibre of at least 30 F.; if  $3\frac{1}{4}$ , it will be 32 F.; if  $3\frac{1}{2}$  = 34 F.; if  $3\frac{3}{4}$  = 36 F.; if 4 inches = 38 F.; and if  $4\frac{1}{2}$  = 40 or more.

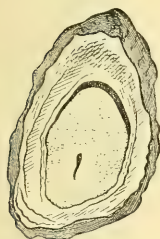


The degree of *mobility* of different portions of the urethra is chiefly influenced by the attachments of the neighboring fasciæ. The anterior part of the penis is free, and capable, in a flaccid condition, of assuming almost any position; in its posterior third, however, this organ is connected with the symphysis by means of the suspensory ligament, with the ischiatic and pubic rami by the crura of the corpora cavernosa, and with the anterior layer of the triangular ligament by means of the bulb; the spongy urethra may therefore be said to be fixed in proportion as it approaches the membranous region. The membranous region is the least movable of all, owing to its firm connection with the pelvis by means of the two layers of the triangular ligament. The prostatic urethra is susceptible of some slight change of position, dependent upon the action of the anterior fibres of the levator ani, the amount of urine in the bladder, and the passage of sounds or catheters.

In a flaccid condition of the penis the urethra has two curves—the first confined to the anterior, the second to the deepest, portion of the canal. The former is simply due to the dependent position of the anterior part of the organ, and is effaced in a state of erection or when the penis is elevated to an angle of about  $60^{\circ}$  with the body. The latter is called the subpubic curve, from its position beneath the symphysis. Unless some degree of force be used to straighten the canal this curve is permanent, and a knowledge of its direction is essential in determining the proper form of instruments and the manner of their introduction.

The subpubic curve commences an inch and a half anterior to the bulb in the penile urethra, attains its lowest point when the body is

FIG. 12.



Section through the prepuce and glans.

FIG. 13.



Just behind the meatus.

FIG. 14.



Through prepuce at base of glans.

FIG. 15.



Through prepuce and corona glandis.

FIG. 16.



Sections just behind the corona glandis, spongy and cavernous bodies well shown.

FIG. 17.



FIG. 18.



FIG. 19.

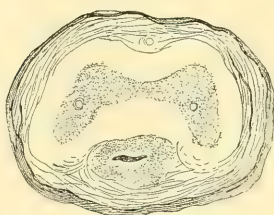


FIG. 20.

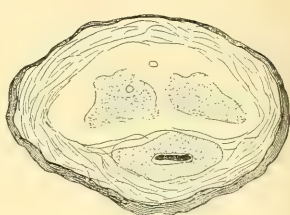


FIG. 21.

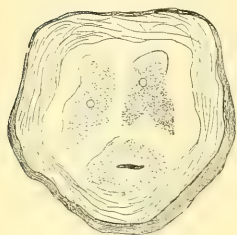
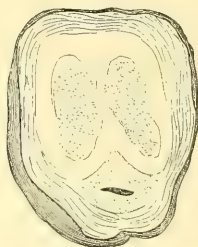


FIG. 22.



FIG. 23.



Figs. 18 to 23 show sections from before backward through the penile urethra. The pectiniform septum is complete except in Fig. 19, where corpora cavernosa are continuous with one another.

FIG. 24.

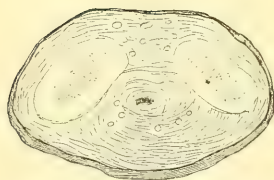


FIG. 25.

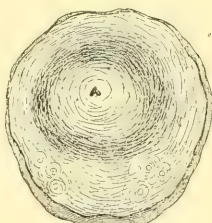


FIG. 26.



Through bulbo-membranous junction, urethra surrounded by some anterior fibres of the compressor.

Through apex of prostate.

Through middle of prostate, capsule of prostate well shown.

FIG. 27.

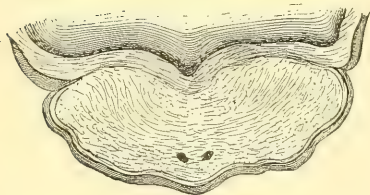
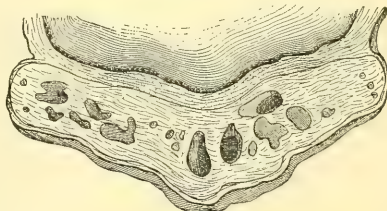


FIG. 28.



Through the bladder and prostate, behind the urethra.

Just behind the prostate, through the bladder and seminal vesicles.

in the upright position nearly opposite the anterior layer of the triangular ligament, and finally ascends through the membranous and prostatic regions. According to the observations of Mr. Thompson and Mr. Briggs, it "forms an arc of a circle three inches and a quarter in diameter, the chord of the arc being two inches and three-quarters, or rather less than one-third of the circumference." Mr. Thompson states that he has often found it more acute in spare men, and in the corpulent more obtuse—that traction of the abdominal muscles exercised through the suspensory ligament may also render it more abrupt, whence the advantage of raising the shoulders when performing catheterization upon patients in the recumbent posture. The elevation of the bladder above the pubes in children, and the enlargement of the prostate so common in old men, also effect a change in the direction of the subpubic curve from its usual adult standard, and require, therefore, a corresponding variation in the form of instruments. Swellings and abscesses about the lower extremity of the rectum, large hemorrhoidal tumors, and various other conditions may also operate in a greater or less degree to cause some change in the direction of this curve.

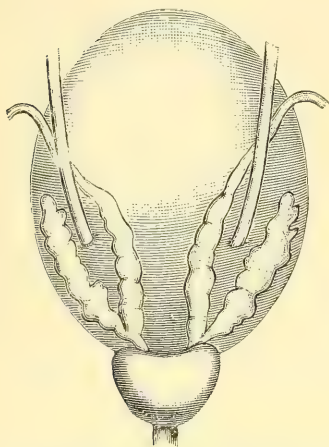
The urethra is far from uniform as regards its shape and conformation in its various positions. This is well shown in Figs. 12 to 26, taken from sections of the frozen penis between the end of the glans and the bladder. The canal is seen to be a vertical slit in Figs. 12 to 17. This vertical condition exists as far as the junction of the navicular with the penile urethra. In the penile urethra proper the canal becomes transverse, and so remains in its whole extent as shown in Figs. 18 to 23. At the bulb it becomes round, and so remains at the bulbo-membranous junction and in its membranous portion. At the apex of the prostate it is somewhat changed, as shown in Fig. 25. In the middle of the prostate the urethra looks like an inverted Y—thus,  $\wedge$  (see Fig. 26)—between the arms of which is the verumontanum containing the utriculus masculinus. At the bladder the urethro-vesical orifice is nearly round, the circle being impinged upon by the uvula vesicæ at its lower segment. In Fig. 27 the very beginning of the urethra is shown in the depression in the centre of the base of the bladder. This is the posterior surface of the urethral orifice, its anterior surface, formed by the prostate, not being shown in the section. The two dots near the under surface of the prostate indicate the ejaculatory ducts, which run side by side. Fig. 28 shows a section behind the prostate, through the bladder and the seminal vesicles.

The seminal vesicles are two membranous pouches situated at the base of the bladder, between it and the rectum. They are loosely yet firmly attached to the bladder on their upper surface, and between them and the rectum is a layer of the vesico-rectal fascia. Each vesicle is somewhat pyramidal in form, measures two and a half inches in length, about half an inch in breadth, and a quarter to a third of an inch in thickness. The anterior or pointed extremities of the seminal vesicle are situated within a finger's breadth of each other on each side of the median line, just at the base of the prostate. They then diverge from each other so as to form the letter V when the bladder is full. The trigone is the space in the bladder which corresponds with the V-shaped space at its base. Just near the prostatic end of each vesicle, on their inner side, they are



joined by the corresponding vas deferens, and they fuse together and form the common ejaculatory ducts, which tunnel the prostate side by side and open on the lip of the utriculus masculinus or into its cavity. At the prostatic end of the seminal vesicles and the vasa deferentia these structures lie together so closely in juxtaposition that it is difficult, if not impossible, in health to define their contours by the finger-tip in the rectum, and even more difficult in diseased conditions. This difficulty is much increased when the amputation of the vasa deferentia, which is frequently found here, is very pronounced. (See Fig. 29.)

FIG. 29.



Showing the relations of the seminal vesicles, vasa deferentia, ureters, prostate, and urethra.

the vesicle is seen with its tubes rendered distinct, but in natural coaptation, by the removal of the connective tissue. On the left hand, however, the tubes are shown, three in number, after being dissected apart. The inner tube is seen to have a decided distal enlargement; the middle tube is seen to join the third tube at right angles. These two tubes bear the same relation to each other that the blade of a jack-knife does to its handle. The outer enlarged tube, of dog's-ear shape, is called the handle of the jack-knife and the middle tube its blade. When placed in natural coaptation the knife-blade fits snugly in the concavity existing in the handle. It is necessary to understand the form of arrangement of the tubes of the seminal vesicles for reasons stated in the chapter on the diseases of these structures.

The seminal vesicles have three coats—a fibrous, a muscular, and a mucous coat, the latter covered with columnar epithelium and studded by various small tubular glands. The seminal vesicles serve as reservoirs for the semen; they also secrete a mucous fluid which becomes mixed with the semen. It is well to remember that the apex of the prostate is about half an inch or more from the anus, and that its base is fully an inch and a half farther back and upward; consequently, the finger-tip must certainly be within the rectum for at least an inch and a half before the vesicles are reached. In some thin subjects this is accomplished quite readily, but the examination is more difficult and the results are more unsatisfactory in proportion as the subject is fat and compactly built.

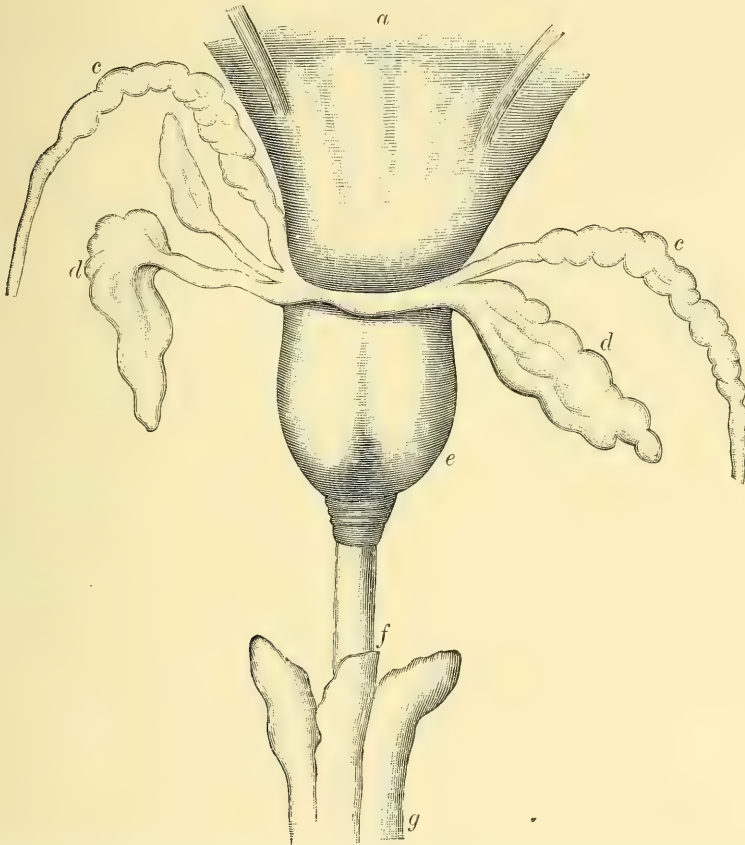
Near the base of the seminal vesicles the peritoneum is reflected from the anterior surface of the rectum upon the bladder. The space between the base of the bladder, with the attached prostate and seminal vesicles, and the rectum is filled with a quite dense connective tissue, the rectovesical fascia, which is very dense and firm at the prostate. It is through this space, by means of a semicircular incision anterior to the anus, that



the seminal vesicles are reached in cases of abscess pointing toward the rectum, and in tuberculosis of these organs.

The testicles are two oval glands suspended in the scrotum by the spermatic cords. These glands are flattened on their sides and hang obliquely, the upper portion being directed forward and outward, the lower border backward and inward. Around the superior and posterior surface of each testis is a crescentic-shaped body called the epididymis,

FIG. 30.



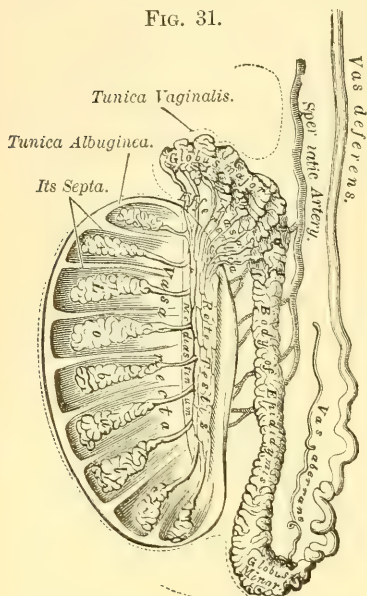
Showing the bladder and ureters, the ampullated end of the vas deferens, seminal vesicles, prostate, and membranous urethra: *a*, bladder; *b, b*, ureters; *c, c*, vasa deferentia; *d, d*, seminal vesicle; *e*, prostate; *f*, membranous urethra; *g*, corpora cavernosa, corpus spongiosum, and bulbous portion of the urethra.

which consists of three segments, the upper and larger one being the head, also called the globus major, the middle portion the body, and the inferior portion or globus minor.

The glandular structure of the testis is shown in Fig. 31 in the form of conical-shaped lobules with bases at the circumference of the organ and apices ending in the mediastinum testis. These lobules are enclosed in fibrous tissue which extends between the mediastinum and the tunica albuginea, or proper fibrous tissue of the testes. These lobules are made up of convoluted seminiferous tubes, of which there are more than eight hun-

dred, each one of which when dissected out and unravelled measures two and a half feet. These lobules contain seminal cells and spermatoblasts. In the connective-tissue meshwork which surrounds the lobules are fine

FIG. 31.



Vertical section of the testis and epididymis (after Gray).

capillary vessels and nerves. At the mediastinum the tubules bend at right angles, and these form the vasa recta (twenty or thirty in number), which pass vertically upward and perforate the tunica vaginalis. As these minute tubes pass through the upper part of the tunica vaginalis they become larger and less numerous (fifteen or twenty), and are called the vasa efferentia. They then become much enlarged and convoluted, and form cone-shaped masses, called the coni vasculosi, which, together with vessels, nerves, and connective tissue, constitute the globus major of the epididymis. The tubes of the coni vasculosi end at the lower part of the globus major in one tube, which becomes intricately convoluted, and thus forms the body of the epididymis and the globus minor. This convoluted tube is fully twenty feet in length, and it increases in calibre until it merges in the vas deferens.

The tunica vaginalis is a serous pouch which covers the testes and epididymis, the attached portion being called the visceral layer (tunica vaginalis propria), and its reflection upon the scrotal wall the parietal layer (tunica vaginalis reflexa). Inflammation of the gland-substance and œdematous hyperplasia of the globus major may produce dropsy of this serous pouch, which is called hydrocele.

The vas deferens, or seminal duct, begins at the lower part of the globus minor and runs upward along the inner and posterior border of the testes. It is here accompanied by the spermatic artery, the artery of the vas deferens, and the cremasteric artery. Besides these vessels are the spermatic veins, coming from the back of the testes, which become convoluted and form the pampiniform plexus. All these vessels, together with a rich nervous supply, form what is called the spermatic cord, which is surrounded by a distinct fibrous sheath. At the internal abdominal rings the vessels join their several trunks, while each vas deferens descends into the pelvis, crosses the external iliac artery, curves around the bladder on the outer side of the epigastric artery and inner side of the ureter, backward and downward to its base; there it usually becomes ampullated and joins the duct of the seminal vesicles, forming the common ejaculatory duct. Each vas deferens is from eighteen to twenty-four inches long.

The testes are covered by the scrotum, a musculo-cutaneous pouch which is divided into two parts by a fibrous septum. This cutaneous envelope and its dartos muscle, together with the external spermatic fascia, cremaster muscle, infundibuliform (internal spermatic) fascia, and the tunica vaginalis, constitute the coverings of the testis.

## CHAPTER II.

## GONORRHŒA IN THE MALE.

GONORRHŒA, the most frequent of all venereal diseases, and the one essentially of sexual origin, is a virulent process, attended by much supuration, which attacks chiefly the mucous membrane of the urethra, male and female, and the parts in immediate and more remote anatomical relation. The mucous membrane of the eye is also particularly susceptible to its action. There is no doubt that the rectal and anal mucous membrane may be attacked by this process, but there is much doubt about the existence of gonorrhœa of the mouth and nose. The term "gonorrhœa," which signifies a flow of sperm (from *γονη*, sperm, and *ρῆω*, to flow), although etymologically incorrect, is so old, has so long been employed, and carries with it so much clearness and precision of meaning to the medical and lay mind, that it is well to retain it in our nosology. It is also called urethritis, blenorhagia, blenorrhœa; *chaude pisse* by the French; *tripper* by the Germans; and plain clap by English-speaking nations. In this work the terms gonorrhœa and urethritis will be used interchangeably.

It is claimed by Ricord that 80 out of every 100 men living in large cities suffer from gonorrhœa at some period of their lives.

Gonorrhœa is found much more frequently in the male than the female. The first attack is usually more acute and severe than are subsequent ones, which are very often subacute in form and chronic in course. When many years have elapsed between two infections, the second may be equally as severe as the first.

Gonorrhœa is mostly found in young men, but instances of children, and even infants, being thus affected are far from uncommon. Toward puberty it is very often found in the male, while between the twentieth and thirtieth years its frequency of occurrence is greatest. From the thirtieth year onward its occurrence grows progressively less frequent, but it is seen in a goodly number of cases of middle-aged, and even of old, men. Isaacs<sup>1</sup> reports the case of a man one hundred and three years old who applied for treatment of a florid gonorrhœa. This particularly virile individual had suffered from chancroids when he was one hundred years old. The male sex derives it by infection from the female, and *vice versâ*.

In the vast majority of cases gonorrhœa is communicated by direct infection in coitus, but it is possible that it may be contracted by mediate infection, particularly in women. The pus from the infected genitals of a girl or woman may be deposited on those of a healthy person by means of the fingers, or it may be transported upon towels and syringes or in baths. The time-worn explanation of the origin of the trouble by contact with a foul privy or urinal may be looked upon as a euphemism to be used in the case of some clerical, venerable, or married transgressor. In very many cases of men who have had an initial

<sup>1</sup> *Med. Record*, April 14, 1894, p. 462.



attack of gonorrhœa acute urethral suppuration may be solely due to sexual and alcoholic excesses, which have changed a chronic and dormant localized inflammation of the urethra into a more or less acute condition.

Gonorrhœa is one of the most persistent diseases which attack mucous membranes. It invades the tissues deeply, and as a consequence it is very often difficult to cure. After a more or less prolonged chronic stage it often settles down into a latent and dormant condition in a localized form, and may thus cause no symptoms for years. Then, again, this condition of latency may be frequently varied by acute attacks of the disorder.

When all the features, complications, and sequelæ of gonorrhœa are taken into consideration, it will be seen that it is a disease of no insignificant character. In many cases it passes away and leaves no bad effects. In others it leads to the development in the male of such painful complications as swelled testicle and abscess in connection with the urethra. In the female it may lead to cystitis, inflammation of the os uteri, the tubes, the ovaries, and even to peritonitis. Its long duration in the male urethra frequently leads to stricture, with its distressing and often fatal results from bladder, prostatic, and kidney complications. By the action of the toxins which the gonorrhœal process gives forth, and also from the absorption of its virulent microbes from the urethra into the circulation, violent and painful inflammations of joint-structures, joints, tendinous sheaths, bursæ, fasciæ, and fibrous tissues are produced. In many of these inflammations gonorrhœa seems to produce a true septicæmia through the action of its own virulent microbe. In many cases it is very probable that the morbid action of the gonococcus prepares the tissue for the invasion of pyogenic microbes. By these combined or mixed forms of infection the whole organism may be involved, and severe illness, structural impairment of parts, invalidism, and even death, may be produced. By reason of this action of the gonococcus alone or aided by that of other pyogenic microbes the eyes, the heart and its membranes, the coverings of the spinal cord (and, it is also claimed, those of the brain) may be attacked, and serious, even fatal, results may follow.

When we consider the vast range of pathological conditions which gonorrhœa may cause or lead to, we are certainly warranted in asserting that it is, taken as a whole, one of the most formidable and far-reaching infections by which the human race is attacked.

The demonstration of the fact that the gonococcus and other pyogenic microbes are the cause of urethral suppuration has clearly proved that gonorrhœa is an essentially virulent process.

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## CHAPTER III.

## THE GONOCOCCUS.

THE gonococcus is reliably revealed to the eye by means of staining processes<sup>1</sup> and by the microscope with a high power and oil-immersion, using at least a  $\frac{1}{12}$ -inch lens. It is a relatively large micrococcus, nearly always appearing as a diplococcus. It measures 0.8 to 1.6 micromillimetres in length and 0.6 to 0.8 micromillimetres in breadth. The gonococci are usually found in pairs, each half of the diplococcus being of kidney shape, and the two thus resemble a coffee-bean or a French roll. Occurring thus in pairs, they lie close together, their flattened surfaces being in close coaptation and their outer margins convex. Between each coccus is a very narrow split which shows as a bright line. In these particulars the gonococcus resembles other diplococci. In its multiplication this diplococcus divides by a transverse cleavage or at right angles to the median fissure. By this means of fission each pair of the diplococcus is converted into four diplococci, which are grouped in fours. The mode of division is schematically pictured in Fig. 32. Beginning at the left hand of the figure, the line of cleavage is shown to be more and more distinct until the full development is reached, as pictured in the right-hand figure. In this way these micro-organisms increase and multiply. Other diplococci, however, develop in a similar manner. From this method of transverse fission and growth originates the peculiar grouping of the gonococcus into twos and fours and their multiple derivatives. It must be remembered, however, that, owing to their rapidity of growth, we sometimes see these cocci of varying sizes, and not infrequently the halves are not quite symmetrical in size.

In the acute stage of gonorrhœa these diplococci are found in greater or less number encapsulated in masses within the pus-cell. When numerous and thus seated they have been said to present the appearance of a swarm of bees. Under rather low powers they look like little particles of gunpowder. They may be so numerous within a pus-cell as to rupture its wall. Then we find the cocci lying free in the serum, scattered in a disordered manner between the pus-cells, but even then presenting the four and multiple-of-four arrangement. Early in the infection gonococci are seen seated upon epithelial cells.

Under microscopical examination gonococci are readily found and recognized in the pus of acute gonorrhœa. Then the clinical features of the infection and the microscopical picture of the discharge and its pus, epithelium, if present, and diplococci, taken together, are so striking and unvarying that a mistake can scarcely occur. But in later stages of true gonorrhœa, and in many more or less subacute cases of urethral

FIG. 32.



Morphology of the gonococcus (after Bumm).

<sup>1</sup> In unstained preparations the gonococcus looks like a minute roundish body, which may be distinguished from the surrounding cells and their nuclei by a peculiar clear pearl-like sheen and its quick rotatory motion.

suppuration, it is very often most difficult, and sometimes impossible, to say whether the microbe is the gonococcus or some other form of diplococcus. In many cases the crucial test rests in cultivations and inoculations.

While, however, there is no single individual sign or mode of distinction of the gonococcus, there are a number of signs which, when taken together, offer strong presumptive evidence that the microbe in question is the one just named. These, as given by Neisser and others, are—

1. The shape, which is, as we have seen, roundly oval, with its median fissure and its roll-like or coffee-bean appearance, and its lengthwise fissure. Still, as Bumm says, many pathogenic and non-pathogenic diplococci resemble the gonococcus very closely, even to the very fine point only made out by high powers—namely, a slight indentation which is sometimes seen in the contiguous surfaces of both hemispheres.

2. The size: they are large diplococci, and in their development are variable and resemble other diplococci.

3. The grouping, as a result of their mode of division, is in single pairs, in fours, eights, sixteens, etc. They never occur in chains.

4. Their intracellular position: the gonococci are found in heaps within the protoplasm of the pus-cells, and also scattered between the cells in varying numbers. Other diplococci, however, are also found within the pus-cell. Steinschneider<sup>1</sup> emphasizes the fact that this disposition in heaps of other diplococci is so irregular and different from that assumed by the gonococcus that a mistake is impossible.

5. Their staining properties: gonococci are readily stained by aniline colors, and they readily lose their staining by Gram-Roux's<sup>2</sup> method. This quality is very characteristic of the gonococcus, but it is also possessed by certain other diplococci, by streptococci, and by staphylococci. Neisser<sup>3</sup> himself concedes this point, and says the intracellular disposition of diplococci is nearly an exclusive property of the gonococcus.

In this connection it must be remembered that Legrain, Bockhart, Zeissl, Eraud, and Hugounenq and Hogge have found diplococci in masses within the cells in specimens of urethral secretions. Consequently, the student must be cautious in drawing conclusions. The intracellular grouping of micro-organisms in other than urethral pus has been found by many observers.

The truth of the matter is this: that while in the secretion of florid gonorrhoea it is easy to recognize the gonococcus, it is very difficult in chronic and subacute cases even for skilled and experienced persons to say that a given coccus is the gonococcus from microscopic study alone. In such cases, to be absolutely positive, cultures must be made. It follows from this that we should not accept most of the statements made of the discovery of the gonococcus in chronic urethral affections.

**Methods of Staining.**—For general purposes a solution of methyl blue is all that is needed for staining gonococci, but fuchsine, methyl violet, gentian violet, and victoria blue may be used. The technique is as follows: Spread by means of a platinum-wire loop some of the pus, threads, or secretion<sup>4</sup> on a cover-glass in a very thin film, or place a drop

<sup>1</sup> *Vide infra.*

<sup>2</sup> *Vide infra.*

<sup>3</sup> *Vide infra.*

<sup>4</sup> Neisser and Finger recommend, when the secretion is very scanty, that an injection of sublimate, 1 : 10,000, or of nitrate of silver, 1 : 2000, shall be made in order to produce

of the secretion in the centre of a cover-glass, and then place another cover-glass over this. Then separate the two by sliding them over each other, not by pulling them apart. In this way two evenly-spread specimens are obtained. It is always necessary to thoroughly wash the glans penis and the meatus before taking the secretion, since many microbes are seated on these parts. In taking secretions from the female genitals scrupulous care should be exercised, so that no extraneous or accidental micro-organisms are gathered up. In dispensary work the secretion from the male urethra may be allowed to drop upon a glass slide, and it is then to be spread out over its surface by drawing the edge of a similar slide over it. The specimen may be allowed to dry in the air or it may be passed two or three times (the right side up) through an alcohol or gas flame. The dried secretion is then lightly smeared with the staining fluid by means of a glass rod.

The simplest and most expeditious method of staining these specimens is to put a drop of a dilute watery solution of methyl blue upon the cover-glass, allow it to remain two or three minutes, wash off with water, and then examine in water. This may be allowed to dry, and then it may be mounted in Canada balsam. By this method, however, the gonococci are not shown so clearly as by others to be mentioned.

One of the most satisfactory and rapid methods of examination is that recommended by Schütz.<sup>1</sup> This is founded on the resistance of the gonococcus to acetic acid after being stained with methyl blue. After the cover-glass is covered with a thin film of the suspected material it is passed three times through the flame. It is then brought in contact with a saturated solution of methyl blue in 5 per cent. carbolic-acid water for five or ten minutes. It is then washed with water and placed, for a time long enough to count one, two, three slowly, in a solution of five drops of acetic acid in twenty cubic centimetres of distilled water, and immediately washed again in pure water. Everything is then decolorized except the gonococci, which remain distinctly blue. The specimen may be then examined and preserved, or at this stage it may be double stained with a very dilute aqueous solution of safranin. This second staining should be very slight, the cover-glass being washed at once in pure water. By this process the gonococci will be found of a deep-blue color, the epithelial cells of the same color, while the pus-cells and their nuclei will be salmon-colored.

Lanz<sup>2</sup> proposes the following method of staining, which makes the detection of the gonococcus very easy: The cover-glass smeared with the gonorrhœal pus is dipped for half a minute in a 20 per cent. solution of trichloroacetic acid, then washed, and dried by means of filtering-paper, then gently heated in an alcohol flame. It is then dipped in a solution of methyl blue for from two to five minutes, dried, and mounted in Canada balsam. Double coloration may be obtained by eosin staining. The gonococci are stained a deep blue, in marked contrast with the pale-blue

a decided discharge. This procedure may be practicable in hospitals, but it should not be employed in private practice, unless with the full understanding and consent of the patient.

<sup>1</sup> "Ein Beitrag zum Nachweise der Gonococcen," *München med. Wochenschrift*, xxxvi., No. 14, 1889.

<sup>2</sup> *Deut. med. Wochenschrift*, 1894, No. 20, p. 200.



color of the rest of the cell. The acid renders the cell and its nuclei transparent, and by this procedure the microbes may be seen in the substance of the nuclei.

Fränkel's<sup>1</sup> method may also be used. This consists in treating the cover-glass preparation for a few minutes with a concentrated alcoholic solution of eosin (by heating the staining fluid). The surplus of the dye is absorbed with blotting-paper; the specimen is at once placed in a concentrated alcoholic methyl-blue solution (for fifteen seconds at most), and then it is to be washed in water. The cocci will appear blue on a red ground. The cellular elements of the blood and pus have absorbed the eosin, while the nuclei and micro-organisms are colored blue.

All these specimens when dried may be preserved in Canada balsam.

Much study has been, and is being, expended upon the perfection of such means of coloring gonococci that their distinctions shall be clearly and absolutely made out. Many observers, particularly those of the Neisser school, place great, almost implicit, confidence in the process known as the Gram-Roux<sup>2</sup> method. The procedure is as follows: Having dried the specimen, it is stained with methyl blue or gentian violet; then it is submitted for two or three minutes to the action of Gram's solution (iodine 1 part, iodide of potassium 2 parts, water 100 parts), which possesses the property of fixing the aniline colors exclusively on the microbes, and not on the anatomical elements. Then the specimen is decolorized in absolute alcohol, washed in distilled water, and then recolored with eosin. The micro-organisms then stand out again clearly in blue or in violet, while the epithelial cells or leucocytes offer a rose-colored background. Roux says that he learned by experiments that Gram's liquid does not sufficiently and firmly fix the basic aniline colors in gonococci, but that as soon as the specimen is treated with absolute alcohol these cocci and the anatomical elements become very difficult to recognize with the microscope. This negative fact therefore constitutes an element of diagnosis, since other micro-organisms do not thus become decolorized. He claims, therefore, that when the presence of gonococci is shown by aniline dyes and upon the addition of Gram's liquid and alcohol they disappear, it is certain that Neisser's coccus is present. On the other hand, if the micro-organisms remain stained, it is in all probability not the gonococcus.

This method, however, when put to the crucial test, has been shown to be in a measure fallible. Lustgarten and Mannaberg, as we shall see, claim that one or several species of diplococci are found in the normal urethra which completely resemble the gonococcus in shape and tinctorial qualities, especially in being decolorized by Gram's method. Steinschneider,<sup>3</sup> Neisser's disciple, admits that Roux's method gives absolute results in about 95 per cent. of cases. In the remaining 5 per

<sup>1</sup> *Text-book of Bacteriology*, p. 330, New York, 1891.

<sup>2</sup> "Procédé technique de Diagnostic des Gonococcus," *Annales des Maladies des Org. Gén.-urin.*, 1887, p. 56.

<sup>3</sup> It is well to emphasize the fact, brought out by Hogge (*vide infra*), that out of the 86 cases examined by Steinschneider only 28 were those of chronic gonorrhœa, and it is in these that mixed and saprophytic infections are most commonly found. The reader is referred to Hogge's paper for some sensible critical remarks as to the possibility of errors in the various modifications used in the Gram-Roux method. If his suggestions are followed, the results will certainly be more accurate.



cent., however, the diplococci resembling gonococci have, he claims, such a markedly different arrangement and distribution that their recognition is easy. Steinschneider says that in doubtful cases after the decolorizing process he stains the specimens with Bismarck brown. Then "at once we got the remarkable results that in all cases in which there was no acute or chronic gonorrhœa present there were among the brown-stained anatomical elements only few bacteria, few diplococci, especially, which were distinguished by the dark-brown staining. If gonorrhœa was present, there were found clusters or individual pairs of gonococci which had the same color as the cells. Never did these diplococci which did not lose Gram's staining show the well-known disposition of gonococci. If they lay in heaps, which was rare, their disposition was so irregular and so different from that of the gonococci that confusion was impossible." It will be seen from the foregoing that, after all, the staining process as a means of diagnosing the gonococcus is liable to lead to error in a goodly proportion of cases. No trouble will be experienced in studying the secretion of acute gonorrhœa even when some weeks old. But the doubt comes in in subacute and chronic cases, just the ones in which we are anxious to determine whether the long-drawn-out inflammation is really kept up by the gonococcus, and whether this micro-organism has, as it is claimed it has, an indefinite life as a morbid agent in the male urethra.

It will be readily seen that these bacteriological studies of urethral secretions are very difficult, intricate, and attended at every step with liability to doubt, confusion, and error; consequently, skepticism and conservatism are warranted, indeed are essential, even in the presence of statements made by experienced and skilled observers.

The consensus of opinion of the most eminent investigators of this subject is that from cultures alone can we get absolutely correct knowledge of the character and identity of micro-organisms. In this way the gonococcus can be demonstrated without any trouble, and confirmation of its existence may be obtained (if a consenting case can be found) in experimental inoculations on the male or female urethra. It must be borne in mind that the mucous membranes of most animals are immune to the virulent action of the gonococcus, but the urethra of the dog can be infected with cultures made in an acid medium.

This micro-organism outside of the human body has little vitality. Its culture media are blood-serum, and blood-serum and agar-agar, and urine and urea, in acid solution. As we shall see, Bumm had much trouble in cultivating the gonococcus, but Wertheim has lately simplified the matter by using human blood-serum with agar-agar on plates. Further than this, Ghon and Schlagenhauser<sup>1</sup> have simplified the method by spreading a drop of human blood over the surface of the agar plate.

My advice to any one desiring to familiarize himself with the biology and morphological characters and nature of the gonococcus, and of other micro-organisms of the male and female genitals, is to study the subject practically in a pathological laboratory.

The other micro-organisms which can, under favorable circumstances, produce urethral suppuration are some varieties of the staphylococci and streptococci, as claimed by Bockhart.

<sup>1</sup> *Wiener klin. Wochenschrift*, No. 39, Aug. 24, 1893.

Our knowledge of the morphological character, life-history, habitat, and pathogenic influence of these micro-organisms is, as yet, very slight indeed. It will require much time, skill, and patience on the part of many investigators to place this subject on a satisfactory and scientific basis.

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## CHAPTER IV.

### THE PATHOGENIC ACTION OF THE GONOCOCCUS.

THE experimental inoculations upon the human urethra by Bumm, Wertheim, Aufuso, and Finger with the cultures of the gonococcus have clearly demonstrated the virulent action of that diplococcus. Let us now study clinically this microbic invasion of the urethra and systematically examine the secretion in the earliest days of the infection. As is shown in another chapter (p. 107), gonorrhoea, like all virulent processes, has a period of incubation of varying length, its shortest being two days and its longest fourteen days, though even longer periods are claimed. In the light of clinical study alone it was difficult to understand why one man's gonorrhoea began two days after coitus, while that of others' came on three, five, and on intervening days up to the fourteenth. It is very probable that certain unknown conditions inherent to the tissues of the penis predispose a patient to gonorrhoeal infection, just as we see some persons prone to tonsillar, pharyngeal, bronchial, and pulmonary inflammations and to infectious processes of the skin. Then, again, the structure and conformation of the organ may present conditions of predisposition. (See chapter on Predisposing Conditions, etc.) Microscopical study, however, further shows that the number of the gonococci seems to be an element in their virulence, and that acuteness of invasion may depend on the quantitative rather than the qualitative element of the gonococcus. It is possible, however, that at certain times and under unknown conditions the virulence of the micro-organism is more or less active. The duration of exposure to the infecting secretion in prolonged coitus, with much alcoholic indulgence, has undoubtedly much to do in many cases with the acuteness and severity of the attack.

When in coitus the gonococci are deposited in the urethra or on the lips of the meatus, they immediately begin to proliferate, and in due time give rise to a scant serous secretion. Clinical and microscopical study shows that different individuals are affected in different ways. In some the attack, as shown by the discharge, comes on briskly and promptly, while in others the morbid process develops slowly and insidiously, and often with much halting. In the very earliest period of gonorrhoea much can be learned as to the mode of invasion of the disease, and as to the pathological conditions in a given case, by the microscopic examination

of the secretion. This scientific examination should be made in every case, since from its results indications of a practical nature may be derived. Not only in the very earliest stage does the microscope give much aid and broad enlightenment in pathology and treatment, but throughout the whole course of gonorrhœa its teachings are invaluable.

As will be shown farther on, the number of gonococci in the serous discharge of the first day or two shows very great differences in individual cases. In some periods, the earlier as a rule, there are enormous numbers of gonococci in the discharge, while during the latter stages of the attack there are frequently so few of them that but one or two pus-cells can be found in the entire field containing gonococci. So a drop of discharge at one stage of the attack may contain, estimating it roughly, but two or three or several hundred gonococci, while at another time the drop holds enormous quantities of the cocci—a million or more. A glance at Figs. 35 and 36 will illustrate this numerical difference of the cocci in two different specimens of gonorrhœal discharge.

Thus when gonorrhœa is contracted, as a result either of the duration of the exposure to the infecting pus or according to the stage of development of discharge in the donor, the number of gonococci received may vary within very wide limits. This numerical variability, then, in the gonococci seems in a measure to determine the period of incubation and the character of the onset of the discharge. The vulnerability of the tissues and the conditions favorable to inflammation also have much to do with the promptitude of the onset of the inflammation.

In some cases, where a very few gonococci embodied in the pus-cells are received, the discharge does not become visible for some days, although during this time there is an exudation, but it is so scanty and colorless that it escapes attention. In such a case as this it would seem that so few gonococci entered the urethra that some days are requisite for them to proliferate extensively enough to produce a widespread chemotaxis or attraction of the leucocytes from the blood-vessels of the urethral mucosa, or that the tissues were not particularly vulnerable. After the gonococci have proliferated and become more extensively distributed over the urethra, a widely-spread and severe exudative inflammation of the urethra takes place more or less suddenly. An attack of gonorrhœa would be liable to begin in this slow, mild way if the infection originated from a similar discharge, such as fairly old gleet or declining gonorrhœa, in which it takes considerable searching with the microscope to find a pus-cell here and there containing gonococci.

In other cases a severe discharge, muco-purulent from the beginning, occurs suddenly within forty-eight or seventy-two hours after the exposure. In such a case as this we may suppose that a very large number of gonococci enter the urethra and proliferate extensively. The initial cocci are not localized, but become rapidly distributed—perhaps at the exposure—over a large surface of the urethra, and exert chemotaxis, or, in other words, produce inflammation simultaneously at many points over a large segment of the urethra. A glance at Fig. 37 will show how the great numbers of gonococci swimming about free in the serum would be distributed almost immediately over a large tract of the urethra in virtue of its capillary attraction, from before backward, if a portion of such a discharge entered the meatus.



Between these two extreme types of acute and mild invasion there are all sorts of intermediate grades of the incubation.

*Slow Invasion.*—In the cases of long incubation—where there seem to be but few gonococci received at the infection, and that these remain localized for a few days before proliferating extensively enough to spread over a considerable part of the urethra, an exudation really exists during the whole period of the incubation. This exudation in the beginning is almost a microscopic element; it is exceedingly limited and serous, and so generally escapes attention that there is seldom an opportunity to examine it microscopically. After two or three or several days this scanty serous exudation, becoming gradually more copious, suddenly changes and becomes a purulent discharge. This sudden change indicates the period when the gonococci have proliferated and become extensively enough distributed to excite general chemotaxis. (Compare the increase of the gonococci in Figs. 33 and 34.)

In the very beginning of the prodromal or exudation stage antecedent to the onset of the purulent discharge in these cases of slow incubation there is simply a thin or sticky moisture of the walls of the urethra. In a day or two more the exudation grows more material and a transparent drop the size of two or three pin-heads may be forced out of the meatus by gentle pressure. The exudation may in exceptional cases stay this way for a week. Although this exudation is not seen during the day, it appears in the first part of the urine as scanty lump-like masses. The discharge is best seen in the morning, and it then looks very much like glycerin, except that suspended in the drop are some minute translucent and whitish flocculi, like tiny particles of rice-seeds or suet. A

FIG. 33.



Gonorrhoeal discharge in the early days of infection in a case of long incubation, showing pavement epithelial cells on which a few gonococci are seated, and a few pus-cells which as yet contain no gonococci.

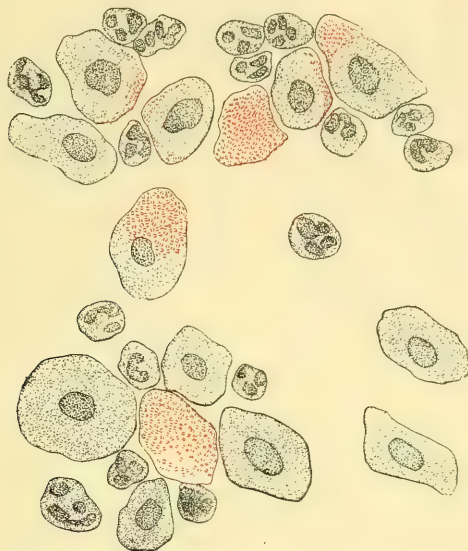
little later the drop becomes more copious, appears during the day, and is streaked with whitish-yellow streaks; then, perhaps in a few hours or within a day, the drop may change suddenly and radically, when it becomes entirely yellow and creamy, thick and copious, and takes on the characteristics of the ordinary purulent discharge.

The structural features of the discharge in this early stage of its development in these cases of long incubation are as follows: The exuda-



tion consists largely of fluid or serum containing some desquamated epithelial cells, and later on only a scattered pus-cell here and there. In the early stages the desquamated epithelial cells predominate, and as the

FIG. 34.



Showing the features of the discharge a few days later than are shown in Fig. 33. The epithelial cells are covered by an increased number of gonococci, but these microbes are not as yet contained in the substance of the pus-cells, which are rather more numerous.

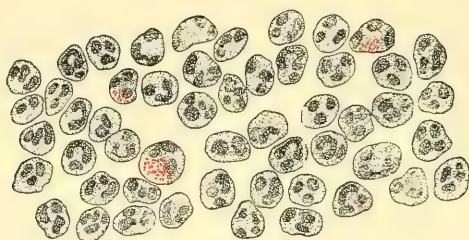
exudation progresses the pus-cells become more numerous. (Compare Figs. 33 and 34.)<sup>1</sup>

It is the desquamated clusters of the cells lining the urethra that produce the appearance of the rice-like or suet-like granules in the clear drop. Finally, when the drop suddenly becomes yellow, the epithelial cells disappear almost entirely or are overshadowed by the enormous numbers of pus-cells.

<sup>1</sup> The case which furnished Figs. 33, 34, and 35 is extremely interesting and merits a brief recital: Four days after a short and incomplete coitus the patient noticed a slight moisture, with some translucent particles, at the meatus. This condition continued unchanged for seven days (the eleventh day after exposure), when the secretion amounted to a small drop in the morning, and was perfectly clear and contained rice-like particles. A specimen taken at this time presented under the microscope the appearances shown in Fig. 33. There we see a few cocci at the edge of an epithelial cell, but none in the few pus-cells present. Eight days after this (the nineteenth of the exposure) a slide taken presented the appearances shown in Fig. 34. It will be seen that the gonococci are much more numerous, and that they are seated on the epithelial cells and at their edges. They are not contained in the pus-cells. Eight days later the gonococci were found in the pus-cells and the epithelium had disappeared. In Fig. 33 there were only eight gonococci, and they were floating free in the serum. In Fig. 34, taken eight days later, they were more numerous, and in Fig. 35, taken eight days later, we see a characteristic picture of confirmed acute gonorrhœa. In this case, therefore, the incubation period was four days and the duration of the prodromal stage, or stage of microbial colonization, was twenty-seven days—a most unusual occurrence. In all probability the small number of the micro-organisms received in coitus was the factor in the slow evolution of the disease. Perhaps the existence of pavement epithelium in the fossa navicularis offered a barrier to the invasion of the cocci. This patient had recovered from gonorrhœa seven months before the present infection.

The gonococci in this stage of scanty exudation, before the regular discharge, may not be found at all by the ordinary cover-glass staining

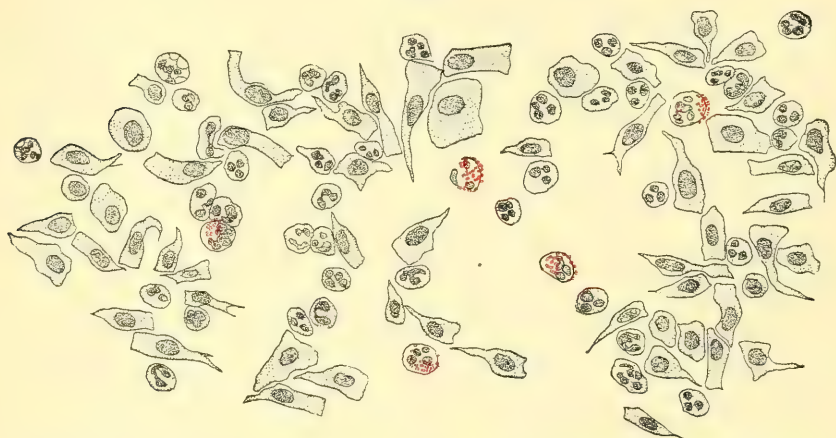
FIG. 35.



Shows the features of the discharge in confirmed acute gonorrhoea, the initial and preparatory conditions of the case being shown in Figs. 33 and 34. The epithelium has wholly disappeared, and only pus-cells containing many gonococci now appear in the field.

tests. If the incubation is very slow, they may be found at first in very limited numbers, entirely free in the serous fluid, later on about the edges

FIG. 36.



Gonorrhoeal discharge obtained a few hours after onset of disease, containing cylindrical epithelium, pus-cells, and gonococci.

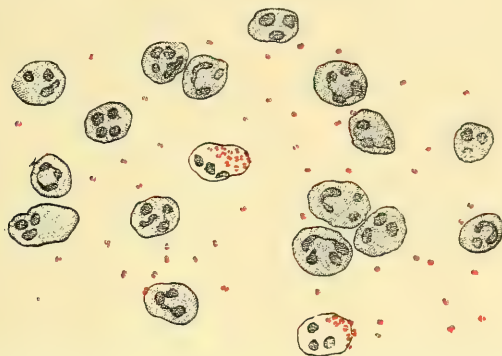
or on the surface of the epithelial cells, and finally exclusively in the pus-cells. It is very interesting to study the spreading of the gonococci over the surface of the cell. At first the micro-organisms may be seen only on the edges of the cell; then they gradually extend until they cover its whole surface, perhaps in several hours or perhaps in a day or two. (See Figs. 33 and 34.)

It is important to remember that when the discharge consists only of serum, epithelial cells, and gonococci, the latter are seated on the cells and they also float free in the serum. This condition also may be observed where a few pus-corpuseles have become mixed in the discharge. At this time, therefore, the micro-organisms may be present only in small numbers in the pus-cells, or they may not be thus placed at all. Later on, when the discharge becomes decidedly purulent, the majority of the gonococci

will be found in the pus-cells, and very few will be free and scattered through the serous fluid.

The behavior of gonococci in a case of long incubation seems to be somewhat as follows: The gonococci received at infection are too few to be generally distributed over the urethra, and hence the chemotaxis they

FIG. 37.



Showing enormous quantities of gonococci in pus-cells and floating free.

arouse is too limited to appear as any appreciable exudation. The cocci seem at first to lie free on the surface of the epithelium, and then they work their way down between the surface cells to the deepest layer of urethral lining cells. As the gonococci thus approach the capillaries beneath the epithelium, chemotaxis comes into play. There is at first a slight determination of leucocytes from the blood-vessels, accompanied by some serum which passes out into the urethra, and synchronously with this there is a desquamation of the epithelium lining the urethra.

As the gonococci become more and more numerous and are distributed to the deeper parts of the urethra in virtue of its capillary attraction, there comes a time when these microbes attract the leucocytes from a considerable territory of the canal simultaneously, and this corresponds to the time when the discharge suddenly becomes purulent and abundant, with the gonococci enclosed in the pus-cell. (See Fig. 35.)

The gonococci are found in the pus-cells, not because the cocci themselves actively penetrate the protoplasm, as has been erroneously stated, but because the leucocytes act as phagocytes. The leucocytes enclose the cocci by virtue of their amœboid properties, and carry them out of the urethra in the purulent discharge. It is the pus-cell, in all probability, which carries the infecting cocci from one person to another, and probably very few individuals are infected by gonococci floating about free in a discharge.

*Acute Invasion.*—The character and onset of the cases of acute invasion may now be considered. In these cases the number of the gonococci received at the exposure is so large, their proliferation is so rapid, or they become so soon distributed—very likely at the exposure—over a large surface of the urethra, that the discharge may be sero-purulent or purulent from the beginning, and in that case the preliminary scanty serous exu-



dation previously described is very evanescent or almost entirely absent. It happens very seldom indeed that in these cases there is an opportunity to examine microscopically the evanescent serous stage of such a discharge, but still there is a stage of desquamation of the urethral epithelium in advance of the purulent discharge. This is well shown in Fig. 36.<sup>1</sup>

The desquamated epithelium appears as tiny rice-colored grains in a clear exudation, but this stage of desquamation is very short in these acute cases, lasting only a few hours, and then the discharge becomes purulent. A further illustration of very acute invasion with myriads of gonococci is typified in Fig. 37.<sup>2</sup>

<sup>1</sup> The case from which Fig. 36 was taken illustrates a very early stage of the discharge in an attack of acute invasion. This patient had a sero-purulent discharge from the beginning apparently (incubation four days), and came under observation a few hours (six or eight) after first noticing discharge. The case (see Fig. 36) illustrates especially well how even in acute cases there is a desquamation of epithelium from the urethra, although it is so transient in these acute cases that it is seldom observed. In this case the urethra appears to have been in the perfectly normal or virgin condition, for the surface epithelial cells have their proper cylindrical shape. There are very many gonococci in this specimen, a considerable number of the pus-cells being loaded with them. A very few scattered gonococci were found free in the serum in groups of twos and fours.

In this case the urethra was probably invaded by a great number of gonococci at the infection—either the man having exposed himself generously—or there were many cocci in the discharge of the donor, or perhaps both conditions were combined. The initial extensive number and distribution of the cocci provoked a rapid acute onset.

<sup>2</sup> Fig. 37 shows a very unusual feature in the large numbers of free gonococci suspended in the liquid portion of the discharge. This figure was not selected with a view to exaggerate this feature, but is taken at random from the slide, which shows quite uniformly the conditions thus pictured. The case was that of a man who had had gonorrhœa seven years before. The incubation period of the present infection was five days. Two of the pus-cells contain forty-eight gonococci, one of them eighteen, and the other forty-eight gonococci, while ninety-eight gonococci were counted lying free in the serous fluid of the same field (Leitz, oil-immersion,  $\frac{1}{12}$  ocular, 4-tube, length 15.5 mm.). Estimating that one drop of this fairly thin discharge could be spread in a thin film over ten cover-glasses 18 mm. square, such a drop would contain, counting roughly, 1,038,260 free gonococci and 524,120 gonococci enclosed in pus-cells; and this, if anything, is a very low rather than a high estimate. This gives a tangible idea of the number of gonococci occurring sometimes in a discharge. A drop of exudation, as in this case, entering a man's urethra would carry a little short of two millions of gonococci.

Apparently in this case the gonococci are proliferating in enormous numbers over the surface of the urethra, and are being distributed over the whole surface of the anterior, if not very soon into the posterior, part of the canal. The specimen was taken from the second day of the discharge, and chemotaxis, or the attraction of the leucocyte by the gonococci, has taken place fairly voluminously, but the proliferation of the bacteria has been more rapid than that of the white blood-cells, which takes an appreciable amount of time. Thus the leucocytes have not yet appeared in sufficient numbers at this particular stage of the discharge to embody the cocci, so that they are free to pass to new portions of the urethra. In reflecting over this latter behavior of the gonococcus, proliferating faster than the white cells can embody them, and passing to all parts of the urethra, we have some sort of rational basis to explain the different grades of severity so well marked in gonorrhœa.

It is very seldom that just such a picture as this, showing so many free cocci, is obtained. Most likely these enormous numbers of gonococci are rather a transient feature of a discharge, for a very extensive observation of gonorrhœal discharge, studied in the light of the doctrine of chemotaxis, shows that the supply of white blood-cells is so excessive in response to the chemotactic demand of the gonococci that they are quite generally engulfed in the body of the leucocyte.

Probably in this particular case a few hours would have sufficed to bring out such an increase of leucocytes that a large majority of the free gonococci would be enclosed in the protoplasm of the pus-cells.

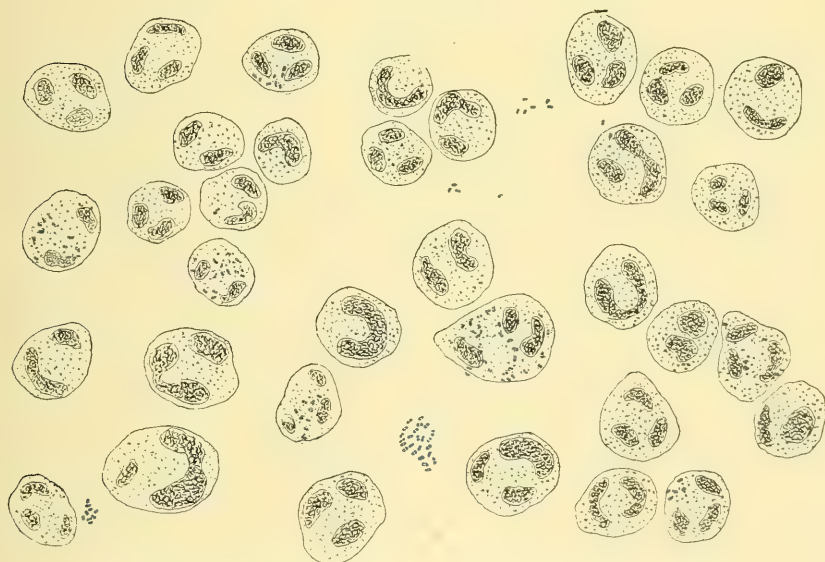
Another interesting feature of this case is the way such a discharge would act in infecting another urethra. If a urethra were infected with such a discharge, the resulting attack would certainly be acute and severe, from the large number of free gonococci. The urethra being endowed with a species of capillary attraction from before backward,

As a general rule, the long incubation of gonorrhœa is best marked in cases where the urethra has been the seat of, or damaged by, previous attacks, while the very acute invasion often is best exhibited in the virgin or normal urethra. In previous protracted or multiple gonorrhœas there is a tendency toward a distinct change in the structure of the urethral epithelium. The urethral lining in places becomes thicker and the surface cells become flattened. Pavement epithelium then replaces the cylindrical variety. To what extent this change in the urethral epithelium determines the long incubation often seen in patients who have had many previous gonorrhœas is a rather difficult question to decide.

Having thus far studied the nature of the discharge in the very earliest stages of both the slow and acute invasions, the later and final stages may now be described.

*The Purulent Stage of the Discharge.*—When the discharge has once commenced and becomes tangible and yellow, so that the patient notices it, its structural characters are very uniform. It consists almost entirely of pus-cells and serum. The pus-cells of gonorrhœa are larger than those of any other form of suppuration. Under the microscope with a moderate power the pus-cells can be seen scattered all over the field, with no tendency whatever to agglomeration or aggregation. Occasion-

FIG. 38.



Showing gonococci in the pus-cells of acute gonorrhœa; much magnified.

ally in the beginning of the purulent stage a number of red blood-cells appear, and finer and coarser bands or sheets of fibrin. Occasionally also a stray rounded or oval epithelial cell may be found here and there. A

these free gonococci would be distributed at once over a large surface, lighting up inflammation at many points simultaneously. The older idea, that gonorrhœa starts in at the meatus, lingers in the fossa navicularis, and then trails slowly backward, certainly does not explain very well a large number of cases, which seem rather to show a simultaneous invasion of several portions of the urethra.

certain proportion of the pus-cells—say, one to twenty or one to fifty—contains from two to fifty or eighty gonococci enclosed in their cell-bodies.

There are seldom any free gonococci except in the earlier stages of the purulent period. This uniform structure of the purulent stage persists right along until the declining stage, and a good idea of the microscopic picture in this stage is shown in Fig. 35, and under a higher power in Fig. 38.

As the purulent stage declines the secretion becomes more whitish from the admixture of mucus, and less liquid. Then it gradually grows less in quantity and more inspissated, so that toward the end of the acute stage it is not seen as a secretion, but as little yellowish-white clumps or threads in the urine. Examination of the secretion of this stage shows masses of pus-cells held together somewhat in thread form by mucus. This condition is the first step in the formation of the gonorrhœal threads, or *tripper faden*.

*The Declining Stage.—Gleet.—Gonorrhœal Threads.*—In the declining period, or after the discharge has persisted as a gleet for some days or weeks, it still consists of pus-cells, less thickly aggregated, however, than in Fig. 35, entangled in sheets of fibrin or mucus, with a variable number of rounded epithelial cells. In this stage healing of the mucous membrane usually begins. The hyperæmia gradually grows less, the morbid surface becomes contracted, lessened in area, and a tendency is observed to render the surface of the mucous membrane normal. In this process exulcerations and eroded spots, caused by the gonorrhœa, become more or less completely covered by an epithelial coating. As this salutary epithelial proliferation goes on there is much desquamation, as well as the escape of serum and leucocytes from the membrane. It thus happens that a larger or smaller number of epithelial cells are found in a gleety discharge. With the appearance of epithelial scales the reparative process may be said to really begin, and as the case progresses the pus-cells become less and less numerous, while the epithelial cells increase in number. Then, if all goes well, these cells gradually grow less numerous, and a cure results. It follows, therefore, when in a declining gonorrhœa pus-cells persist in great numbers, while epithelial cells are scanty, that there is slow progress toward cure. Then, on the other hand, when frequent examinations show that the pus-cells are disappearing and that the epithelial cells preponderate, it is evident that the morbid process is ceasing. As in the early stages, so in the later ones, the microscope gives us great aid in determining the character and extent of the inflammatory process. In these later stages the discharge is commonly so scanty that it does not escape from the meatus, but it is carried from the canal by the stream of urine. This discharge is then seen to be in the form of clumps rounded, irregular, or crab-like, in the form of flakes of various size and irregular shapes, and in the form of threads which may be long and very thin or thick or short and stumpy. The *threads* from either the anterior or posterior portion of the urethra have the same microscopical structure as the gleety drop; they are composed quite considerably of pus-cells entangled in a thick fluid exudation containing fibrin or mucus and generally a variable number of epithelial cells.

*The Question of the Presence of the Gonococcus in Gleet and Threads.*

—This is an exceedingly important subject, since it introduces the ques-



tion of late and remote infection. Many clinicians since the discovery of the gonococcus seem inclined to believe that this micro-organism stays somewhere hidden or quiescent in the urethra as long as the gleet or threads remain, and that it is the direct cause of the gleet or threads. Others go still further and make it appear that the gonococcus may persist in a latent way for a long time after the chronic discharge or gleet has utterly ceased, and that under appropriate irritation it may become active and aggressive again. These observers—who have, moreover, quite a large number of followers in their way of thinking—have apparently come to their conclusions about the lengthy or indefinite persistence of the gonococcus by calling any diplococci which they see about the size of the gonococcus in the secretion of old gleets, gonococci. As we have already seen, there are many species of diplococci very much like the gonococcus in form and staining qualities; consequently, morphological identification of the gonococcus without cultures is apt to be fallacious. I think that this view of the extreme persistence of the gonococcus in the urethra has been much overdrawn, and those who hold it seem to overlook the fact that there is abundant damage done to the urethra by the gonococcus, which produces an exudative inflammation which remains long after that micro-organism has disappeared. On the other hand, I do not state positively that the gonococci promptly disappear in the declining stages—they may persist for some time in the gleety discharge—but after a gleet has lasted for two or three or six months the gonococci are in all probability in most cases absent.<sup>1</sup> To decide precisely when the gonococci

<sup>1</sup> The most elaborate study of the frequency of occurrence of gonococci in chronic urethritis is that of Prof. Goll (*Correspondenzblatt für Schweizer Aerzte*, 1891, vol. xxi. pp. 25 et seq.), but, unfortunately, his results were all obtained from the microscope, which we have shown to be fallible in many cases. Goll's studies were carefully made, the secretion in each case being examined from three to fourteen different times.

The following table will show the dates at which gonococci were found in 1046 cases :

Duration since infection.	Number of cases.	Gonococci found.	Negative result.	Percentage of occurrence of gonococci.
4-5 weeks . . . . .	85	40	45	47 per cent.
6 " . . . . .	54	21	33	38 "
7 " . . . . .	35	11	24	31 "
2 months . . . . .	75	15	60	20 "
3 " . . . . .	76	13	63	17 "
4 " . . . . .	62	13	49	21 "
5 " . . . . .	43	8	35	18 "
6 " . . . . .	55	8	47	14 "
7, 8, 9 months . . .	103	21	87	19 "
1 year . . . . .	83	12	71	14 "
1½ years . . . . .	76	7	69	9 "
2 " . . . . .	135	7	128	5 "
3 " . . . . .	80	2	78	2½ "
4 " . . . . .	37	. . . . .	37	
5 " . . . . .	20	. . . . .	20	
6 and more years . .	22	. . . . .	22	
Cases examined . . .	1046	178	868	

In these studies Goll convinced himself that in some young healthy men the gonococcus disappeared for good in three weeks, which must be regarded as an exceptional occurrence.

A perusal of the table shows that, unless mistakes were made by which other diplococci were regarded as the gonococcus, the latter organism may be found very commonly

disappear is impossible by the microscope alone. In the female there seems at present to be some evidence—in exceptional cases, however—in favor of the long persistence and dormant condition of gonococci in the uterus and tubes.

As a general rule, the gonococcus gradually ceases in the gleet morning drop and in the urine threads. It becomes extinct and disappears out of the urethra, yet the gleet and threads still persist, but this is because of certain structural changes in the urethra left behind by the severe exudative inflammation caused by the gonococcus. All sorts of bacteria may be found in the urine threads and often in old gleans, and among them several diplococci which resemble or look almost exactly like the gonococcus, also long and thin and short and thick bacilli. In fact, by the microscope alone it is almost impossible to positively identify the gonococcus in old gleet or threads; consequently, it is well to be skeptical and perhaps incredulous as to statements of authors that they have found this microbe under these conditions. Unless the author is known as a conservative and skilled observer, or there is inherent evidence of absolute thoroughness, carrying conviction in his essay, his conclusions are not entitled to stand as scientific evidence.<sup>1</sup>

The discharge persists after the extinction of the gonococcus because of the ulcers, erosions, small round-cell residues, and thickening beneath the epithelium or other sequelæ incident to the intense exudative inflammation aroused by the gonococcus. An ulcer or exulceration, especially in a long, narrow, closed sinus like the urethra, will continue to exude indefinitely without any assistance of the gonococcus.

### CHRONIC RELAPSING GONORRHOEA.

Patients with these superficial ulcers or other sequelæ, such as a smouldering inflammatory condition of the vessels and cells of the part, left behind after the extinction of the gonococcus, may become the subjects of chronic relapsing urethritis or "latent" gonorrhœa—termed latent apparently because the gonococcus is supposed to hibernate somewhere in the urethra, and then become active again with appropriate stimulation. The real explanation seems to be this: The gonococcus is not responsible for these intermittent attacks continuing long after the primary attack, but the erosions, ulcers, epithelial deficiencies, or small round-cell residues (corresponding to the granular condition of the mucous membrane), which have never been perfectly healed, light up afresh after debauchery or sexual stimulation. Yet the purulent discharge started up

up to the ninth month of infection; that during the second year it occurs in a goodly proportion of cases, and in the third year in a small percentage; and that it is not found after the third year. The truth of the matter is, that our studies in this direction have hardly commenced, and they should be prosecuted by many observers on many patients in the light of our newly-acquired and yet-to-be-acquired knowledge of the gonococcus and its biology. It will be a long time before dogmatic statements can be made which will stand scientific scrutiny.

<sup>1</sup> In the light of this position it is interesting to know that Sahl ( *Correspondenzblatt für Schweizer Aerzte*, 1887, p. 495) says that he had not once failed to find the gonococcus in the numerous male patients he had examined even after a long duration of the disease. Even Fürbinger, who is a careful and scientific man ( *Die inneren Krankheiten*, 2d ed., p. 438), speaks of the disappearance and reappearance of gonococci after mechanical and chemical irritations of the urethra.

in this way contains no gonococci, although at times diplococci of one kind or another may be found looking very much like the gonococcus or quite identical with it, so far as form and staining reactions are concerned.

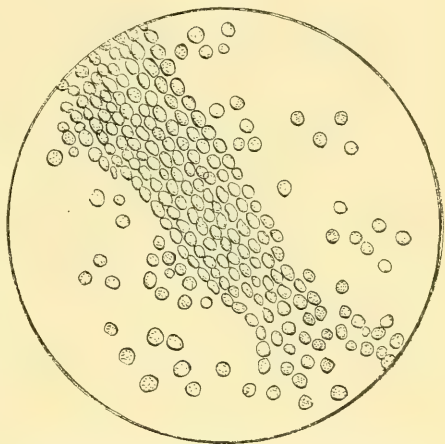
As to the determination of the gonococcus in all these stages of gonorrhœa by the microscope alone without culture methods, it should be said that it is sometimes exceedingly difficult to identify the coccus in the earliest and, as we have said before, particularly in the later gleet, stages of the discharge. In the active purulent stage, however, as we have seen, the identification of the gonococcus is quite reliable, especially when the clinical history and physical signs are dovetailed in with the microscopical examination.

We now come to the study of the pathological products of urethral inflammation, early and late.

Gonorrhœal threads, urethral filaments, also called *tripper faden*, may be divided into four quite distinct varieties. First, there is the pus-thread which has already been alluded to, and is pictured in Fig. 39. It is a thread only in the sense of pus-cells being agglutinated with each other or strung together by means of mucin as a basement-substance. It may be in the form of threads, clumps, and irregular masses. This product is observed just before the appearance of epithelia in the threads. The second is the gelatinous thread. The third is a firm thread, consisting of pus, mucus, round and epithelial cells, and indicative of a well-developed chronic exudative process. The fourth form of thread consists chiefly of epithelium, with very little pus, and some basement mucin to hold the cell-elements together. This product is essentially a desquamation.

The gelatinous threads are seen most commonly toward the end of the acute stage, when mucin comes to be secreted and acts as a cement substance for the cellular exudation. These gelatinous threads are also not uncommonly seen late in the course of gonorrhœa when the exudative process still lingers in the submucous connective tissue and the overlying membrane is in a catarrhal condition. These gelatinous threads are sometimes finer than the finest hair, and are of intermediate sizes until the dimensions of a knitting-needle are reached. They are often very long (three, four, and more inches), and float about in the urine in graceful curves. Then, again, they are thicker, less lengthy, and perhaps of irregular calibre. They are usually very elusive, and are with difficulty captured by the pipette or the forceps, and when caught they collapse into a little gelatinous mass. In this form of thread we find entangled in the cement substance pus-cells, round-cells, and perhaps some large flat epi-

FIG. 39.

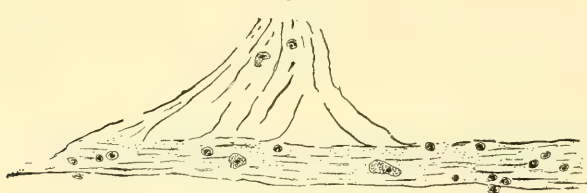


Showing a thread-like agglomeration of pus-cells held together by mucin, being the first stage in the formation of the thread.



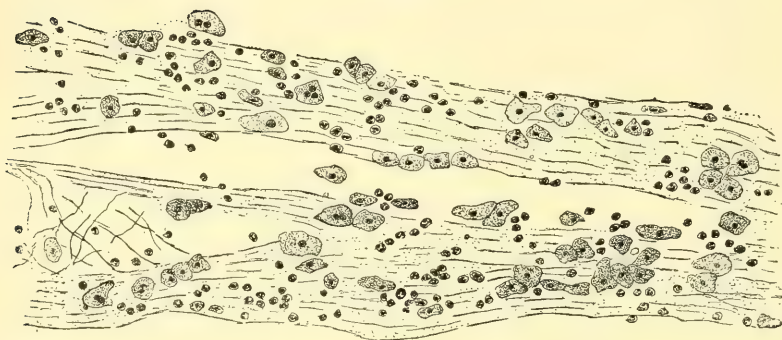
thelial cells. This form of thread is usually seen to follow the pus-thread already pictured in Fig. 39, in which no epithelium is yet present, and

FIG. 40.



Mucin, pus, and epithelium.

FIG. 41.



Showing gelatinous thread with pus-cells, round hyaline (iodophilous) cells, epithelial cells held together by mucin: declining stage of acute gonorrhoea.

which is symptomatic of the turning-point in the acute stage of the disease. With these gelatinous threads there is frequently such an amount

FIG. 42.



Showing secretion of late declining anterior gonorrhoea.

of mucus as to render the urine cloudy, though not opaque, and very often to look like mucilage diluted with water, or new cider. The microscopical appearances are shown in Figs. 40 and 41.

The third form of urethral filaments consists of whitish-gray and brownish-white threads, varying in length from a third of an inch to an inch and more in length. They may be thread-like, thin, and delicate or thick and stumpy. Some have a distinct head, and resemble a comma, and are said to come from the posterior urethra. Then, again, they present branched forms, and some resemble crabs in shape. Indeed, words fail to describe all the shapes assumed by these urethral

filaments. Examined under the microscope, these pathological products

are found to consist of round cells, hyaline cells readily colored with iodine (iodophilous), pus-cells, epithelial cells, oval, polygonal, irregular, fusiform, and caudate. All these elements are held together in the most complete disorder as to arrangement by the basement substance. In Fig. 42 is well portrayed the appearance of the discharge in chronic gonorrhœa of the bulb, and its study will give a clear idea of the microscopical picture.

Attempts have been made without success to establish sharply-marked differences in the microscopical pictures of the discharge in anterior and posterior gonorrhœa. The truth is, that in the main there are the same cellular elements to be seen in the discharge from the anterior urethra as are found in that of the posterior urethra in chronic gonorrhœa. Consequently, in many cases the microscope affords little help in determining exactly where a discharge comes from, but it generally gives a good idea of the condition of the process. In some cases, however, we find dead spermatozoa inextricably mixed up among the cell-groups, and thus we have presumptive evidence that the morbid focus is in the posterior urethra. But even in this event a positive conclusion cannot be reached until it has been proven that the seminal vesicles are not affected, since the same microscopical picture may be presented in seminal vesiculitis. In Fig. 43 the appearances of the discharge from the posterior urethra are well shown. There is much resemblance to the picture presented by the discharge from the anterior urethra already shown. (See Fig. 42.) But it will be seen that there are many spermatozoa scattered and in clumps, and that the round-cells are present in rather greater numbers.

These appearances of the morbid cellular elements in anterior and posterior gonorrhœa may be seen months, and even years, after the onset of the infection. In other words, in chronic cases the morbid process gives rise quite uniformly to the same orders of pathological products.

FIG. 43.



Showing secretion of posterior urethritis in chronic stage.

FIG. 44.



Showing epithelium and pus from a localized morbid area.

The scaly threads or flakes which form the fourth variety are less common than the threads just described. They may be seen in the form of a coarse powder, in threads, in lumps, and flakes of whitish-gray color. They are firm in structure, and readily sink to the bottom of the glass. Examined with the microscope, these flakes show a quite uniform field of flat epithelium in various shapes, which shows stability of structure. Many of these cells are nucleated, and not infrequently they are the seat of fatty degeneration. There are usually some pus-cells intermixed in the field. This form of thread or flake (well shown in Fig. 44) is usually the product of a localized inflammatory process in the anterior urethra as far down as the bulb. It is usually indicative of an erosion or ulcer in which the reparative process is abortive, and, although new epithelium is formed, the integrity of the mucous membrane is not re-established. On finding such a microscopical picture one is warranted in making an endoscopic examination with a view of localizing the morbid area.

In stricture of the urethra the third and fourth varieties of threads are usually found, together with more or less pus and mucus.

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## CHAPTER V.

### INVASION OF THE TISSUES BY THE GONOCOCCUS.

WE have already studied the pathogenic action of the gonococcus in the light of clinical observation, aided by the microscopical study of the gonorrhœal secretions.

The further process of the invasion of the tissues by the gonococcus may now be considered. Owing to the great difficulty, and at times impossibility, of obtaining a urethra the seat of active gonococci-invasion, Bumm studied the subject upon the conjunctiva of infants inoculated with gonococci-containing pus. As the mucous membrane of the eye resembles that of the urethra, and as the two mucous membranes react similarly to gonorrhœal infection, it is fair to assume that the morbid processes and appearances are similar in each instance. It is this want of pathological material on my own part which forces me here to make use of Bumm's observations and results.

Having gained a foothold on the superficial epithelial layers, and there having greatly increased in numbers, the gonococci penetrate between the epithelial cells, which have become swollen and succulent, into the soft protoplasm substance. It is interesting to note that in the infective process the cocci themselves are the active agents in advancing and attack, and that they are not enclosed in pus-cells. Indeed, active participation of the pus-cell is not observed. The spreading of the micro-organisms onward is thought by Bumm to be due to their growing more actively on one side—a condition caused by the difference in soil and probably by an increased supply of oxygen. In all cases the road traversed by the gonococci is through the cement-substance between the cells. Sometimes they





PLATE I.



INVASION OF THE TISSUES BY THE GONOCOCCUS.

squeeze and penetrate by their files; then again they advance in a larger body, and, when the tissues will admit, they form a roundish colony, and from that stage make further incursions into the tissues. When they have got well down toward the subepithelial connective-tissue layer, reaction on the part of the tissues occurs.<sup>1</sup> Then great numbers of white blood-cells escape from the dilated capillaries, together with much serum. This stream of pus, pouring out, breaks through the epithelium or even carries it away in small or large plates. The removal of the epithelium then permits further invasion of the gonococci even to the papillary layer, but there it stops. Pus-cells filled with the gonococci may now be seen, but free gonococci are much more numerous. Coincidentally with this cocci-invasion and multiplication the inflammatory process increases in intensity, and a dense round-cell infiltration is formed beneath the surface of the mucous membrane. This is the transition to the purulent stage of gonorrhœa. In some cases as early as the fourth day regeneration of the epithelium begins and rapidly progresses, and then the further invasion of the micro-organism may be stopped. During this reparative process the pus-cells escape unhindered, and rows and clusters of gonococci may be harbored between the cells of the uppermost layer of the epithelial strata. Under some circumstances there may then be a new invasion by the gonococci. An outpouring of pus destroys more or less of the epithelial layer, and this opens a way for the second invasion. This condition is what occurs in relapses of acute and tolerably acute gonorrhœa. The cocci may develop between the superficial connective tissue and the tunica propria, but they do not luxuriate. It seems probable that they do not find in the deep parts of the mucous membrane the conditions necessary for development, or that they are unable to withstand the influence exercised by the tissue-elements.<sup>2</sup> They are most at home in the superficial layers of the connective tissue and between the epithelial cells.

In this infective process, therefore, we see a violent invasion of a mucous membrane by large masses of gonococci which penetrate between the cells. There is always to be observed a connection between the multiplication and activity of the micro-organism and the intensity of the inflammatory process. The reaction on the part of the tissues corresponds to the intensity of the irritation excited in the soft and sensitive epithelium. So long as there is secretion present on a mucous membrane, the gonococci may remain in it and multiply, for it offers a favorable culture-soil. The great mass of gonococci in the uppermost strata of tissues perishes there from simple dissolution. Final healing is caused not so much through the elimination of the micro-organism as by the development of a protective covering of squamous epithelium in several strata which closes up all gaps, cracks, and inlets to further invasion. The infective process is, therefore, brought to an end by the energetic development of epithelium, which forms a barrier which the gonococci cannot break through.

The foregoing description will be rendered much clearer and more striking by a study of the figures representing microscopic sections of the conjunctiva (Plate I.):

<sup>1</sup> Chemotaxis.

<sup>2</sup> Bumm states that gonorrhœal pus injected into the subcutaneous connective tissue produces no reaction, and that the gonococci soon disappear.



In Fig. *a* is shown a section through the conjunctival fold of the lower lid. The epithelial layer is covered with an exudation which consists of fibrin and pus-cells, and contains free gonococci and others enclosed in pus-cells.

In Fig. *b* the invasion of the conjunctival epithelium by colonies of gonococci is shown.

Fig. *c* shows a perpendicular section through one of the furrows of the fornix conjunctivæ of the lower lid. The conjunctival epithelium is invaded by gonococci. It is desquamating, and is infiltrated with the products of exudative inflammation—serum, fibrin, red blood-cells, and pus-cells.

Fig. *d* shows the ingrowths of large superficial colonies of gonococci in the epithelial layer.

In Fig. *e* is shown a vertical section through the conjunctiva of the lower lid. The epithelium has been completely desquamated, and some of the earliest colonies of gonococci are seen penetrating the conjunctival connective tissue.

In Fig. *f* is shown two colonies of gonococci penetrating still deeper into the subconjunctival connective tissue.

In Fig. *g* is shown the gonococci invading the superficial portions of a papilla.

In Fig. *h* is shown proliferation of gonococci in the superficial oedematous part of an intrapapillary portion of the conjunctival epithelium.

Fig. *i* shows the character of the newly-formed epithelium (after the cessation of the gonococci-invasion), which is somewhat changed and has more the type of squamous epithelium. On the surface there is a small cluster of gonococci.

In Fig. *j* is shown a recurrent invasion of newly-formed epithelium by gonococci.

It is very probable that when gonorrhœa is caused by the staphylococcus and the streptococcus the pathological processes and changes are similar to those produced by the gonococcus.

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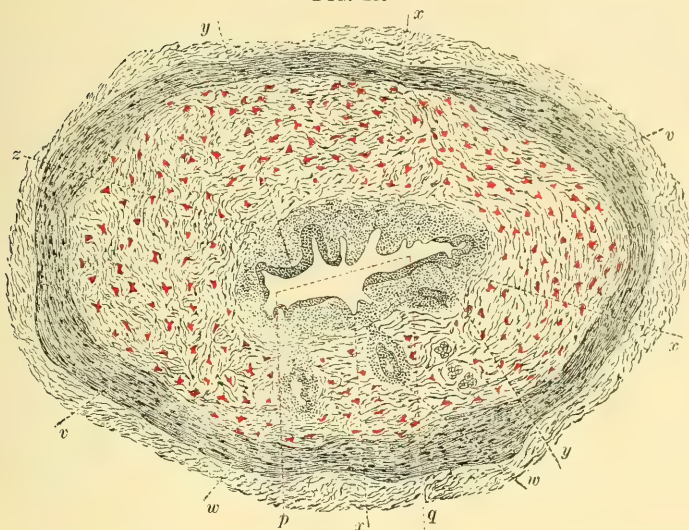
## CHAPTER VI.

### THE PATHOLOGY OF CHRONIC GONORRHŒA AND OF STRICTURE OF THE URETHRA.<sup>1</sup>

As we have already seen, gonorrhœa does not produce a mere catarrhal inflammation of the urethra, from which the membrane might readily return to the normal condition, but in addition a severe exudative inflam-

<sup>1</sup> For a more technical exposition of these subjects the reader is referred to Wassermann and Hallé, "Contribution à l'Anatomie pathologique des Retrecissements de l'Urèthre," *Annales des Mal. des Organ. Gén.-urin.*, vol. ix., 1891, pp. 143, 242, 295 et seq.; also Finger, "Beiträge zur Pathologischen Anatomie der Blennorrhœ der Männlichen Sexualorgane (1, Chronische Urethral-blennorrhœ)" *Ergänzungsheft zur Archiv für Derm. und Syphilis*, 1891, pp. 1 et seq.; and same (2, Chronische Urethritis posterior und die Chronische prostatitis), *ibid.*, *Ergänzungsheft für* 1893, pp. 27 et seq.

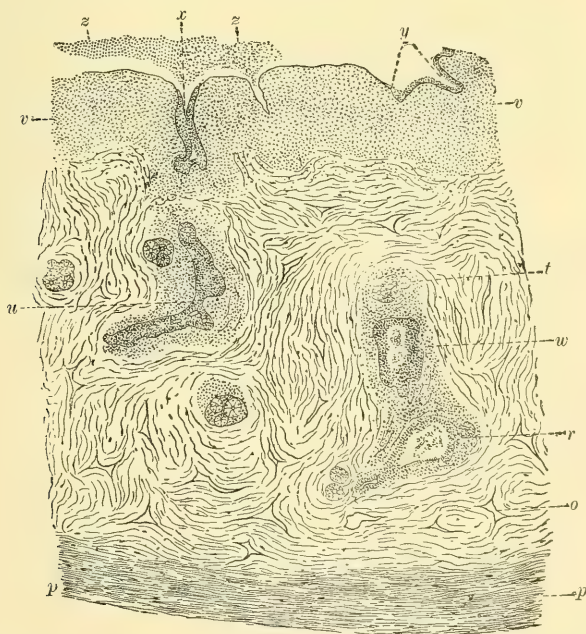
FIG. 45.



Showing a transverse section through the entire urethral canal and tunica albuginea, with round-cell infiltration around urethra and mucous follicles.

mation in the submucous connective tissue results, which has a tendency, if the process persists for a long time, to damage the urethra permanently. We have, therefore, a catarrhal and an exudative process combined. Such

FIG. 46.



Showing a segment of roof of urethra, with round-cell infiltration of the mucosa and tubular ducts of follicles; higher magnifying power than in Fig. 45.

an exudative inflammation induced by the gonococcus is attended first with a desquamation of the urethral epithelium, and when this epithelium is restored it is liable to be more or less thickened and to have a different character from the normal epithelium of the urethra. In other words, the normal cylindrical epithelium of the urethra becomes destroyed by the gonorrhœal process, and is on healing replaced by flat pavement epithelium. These epithelial proliferations are seen by the endoscope to appear like granular and warty patches, and even polypoid growths. When old they may present a whitish, opaque appearance resembling cicatrices. Then, again, the exudative inflammation attending gonorrhœa may produce ulcers or erosions, and frequently induces a formation of connective tissue in the walls of the urethra. The mucous glands may also be considerably changed. Figs. 45 and 46 show the character of the gonorrhœal inflammation, and Figs. 47, 48, and 49 illustrate some of the more important sequelæ of chronic gonorrhœa—namely, stricture-formations.

Figs. 45 and 46 were taken from sections of the urethra of a subject at Charity Hospital who had had chronic gonorrhœa for some months. In Fig. 45 the topographical distribution of the inflammation is shown in a

FIG. 47.



Showing an exulceration of the urethra, with round-cell infiltration-bed and absence of epithelium; newly-formed capillaries in red.

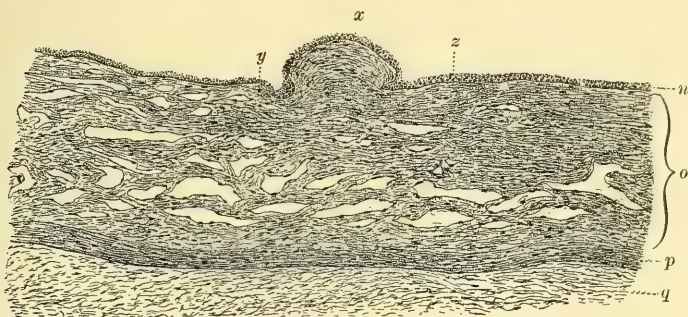
section through the entire thickness of the urethral canal, including the tunica albuginea. The whole folded lumen of the urethra is surrounded by a deep ring of small round-cells ( $z, z$ ), which seem mainly to have come from the superficial vessels of the mucosa, while a part of them may be proliferated connective-tissue cells. The epithelial lining of the urethra is desquamated, and is entirely absent in places ( $x, x$ ), while in other places ( $y, y$ ) it is still in proper position, although infiltrated with pus-cells. In the roof of the urethra, in this section, the ducts of the mucous glands at various depths are also surrounded by a heavy infiltration of



small round-cells, which indicates an extension of the inflammation along the mouths of the glands from the surface of the urethra (*w, w*).

Fig. 46 shows the invasion of the urethra by the gonorrhœal process still more plainly. The drawing includes the whole thickness of a segment

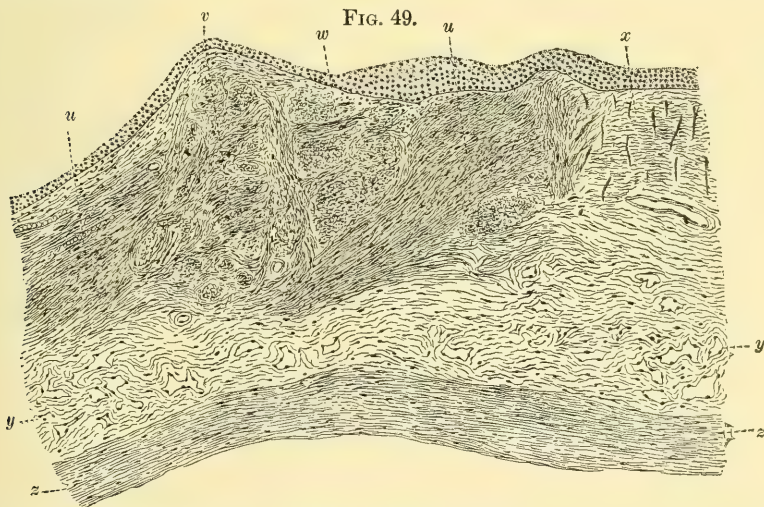
FIG. 48.



Showing a section through a superficially-seated stricture, with moderately dense, newly-formed connective tissue.

from the roof of the urethra, corresponding to the rectangular area indicated by *p q* in Fig. 45. With this higher magnifying power in Fig. 46 the infiltration of the mucosa and tissue surrounding the tubular ducts of the mucous glands is shown in detail. With the exception of the patches

FIG. 49.



Showing a section through a firm inodular stricture, the connective tissue being so dense as to resemble cicatricial tissue.

denoted by *x* and *y*, the epithelial lining of the urethra is absent, so that there are extensive areas of erosion of the infiltrated mucosa.

Lying free in the urethral lumen near the denuded surface is a flake of the gonorrhœal exudation (*z, z*, Fig. 46). This flake is quite identical in structure with the ordinary gonorrhœal discharge as seen on a cover-



glass, and consists mainly of pus-cells lying in a fluid or granular matrix. The mucosa just beneath what is left of the epithelial lining is very densely crowded with small round-cells to the extent shown in the figure at *v*, *v*.

In the same way the ducts of the mucous glands *u*, *w*, and *r*, and in places the gland acini themselves (*t*), are similarly infiltrated with the small round-cells. The ducts *w* and *r* have their lumina partially filled with desquamated cells and granular material.

These figures (45 and 46), then, serve to show that when gonorrhœa has become chronic it must necessarily take a long time for the disease to heal, since in the affected regions of the urethra all this desquamated epithelium must be restored, and the infiltration of small round-cells be disposed of before the urethra can become healthy again.

Among the most important sequelæ of gonorrhœa are ulcers or erosions of the urethra, which are, as a rule, small and sharply localized. Fig. 47 shows a longitudinally situated narrow linear ulcer from the middle of the penile urethra. The section was cut transversely through the urethra. As far as the structure of this ulcer is concerned, it needs but little description, for it does not differ essentially from minute ulcers elsewhere—in the skin or mucous membranes approaching the skin in structure. At the site of the ulcer the epithelium is deficient; there is a fairly circumscribed collection of small round-cells, interspersed with newly-formed capillaries, which tend to pass up vertically toward the surface. In a word, the ulcer has a bed of granulation tissue.

The practical importance of such a condition of the urethra is that it tends to persist almost indefinitely, and keep up a discharge which appears as a scanty gleet or a discouragingly prolonged appearance of gonorrhœal threads.

We now come to the study of more advanced conditions of urethral inflammation and coarctation. Further, then, the exudative inflammation is of great surgical importance, for the reason that it almost inevitably tends, if not properly treated, to the development of stricture of the urethra, with all its dangerous sequelæ. Early in chronic urethritis the newly-formed submucous-tissue infiltration is still soft and succulent, and when it produces very decided diminution of the calibre of the urethral canal, it may be then called "soft stricture." As the morbid tissue grows older, and connective-tissue cells take the place of the small round-cells, it becomes more condensed, and then the stricture can no longer be called soft, and the term "semi-fibrous" may be applied to it. Thus in the domain of chronic anterior urethritis we recognize in clinical practice, as ulterior results, the soft and the semi-fibrous strictures.

Figs. 48 and 49 illustrate two forms of stricture of the urethra. In Fig. 48 is shown one of the forms of large-calibred stricture, while Fig. 49 is from a section of a more extensive tight stricture, contracting the urethra to a considerable degree. These figures serve not only as a text for the exposition of the detailed minute anatomy of urethral stricture, but also as a practical demonstration of the topographical distribution and general structure of two extreme forms of strictures.

Both of these strictures were evident to gross inspection. In Fig. 48 is a section of the stricture shown grossly in Fig. 117. (See chapter on Stricture of the Urethra.) This stricture was situated in about the middle

of the anterior urethra; it lay a little to one side of the roof of the urethra, and looked like a bit of coarse cotton thread stretching across the surface of the membrane for a very limited distance—only three to four millimetres. The urethra was perfectly normal both above and below the tiny constricting band or thread. A vertical section of the urethra passing transversely through this little band presents the appearance shown in Fig. 48.

This stricture is very superficial; in fact, most of it is raised up above the surface of the urethra, although a slight amount of connective tissue stretches out in the mucosa on either side of the centrally-elevated nodule which corresponded to the thread-like band shown. In Fig. 48 the stricture is composed of fairly dense newly-formed connective tissue, which, however, lies very superficially: the wall of the urethra itself is but very little invaded by the stricture. This is a good illustration of the least-developed form of stricture. This band or ring form of stricture is not common, and may be said to be in reality rare. In this case but one imperfect band was present, but in very exceptional instances several bands may be found, which may exist separately, the tissue between them being healthy. As a general rule, when bands of stricture exist, the whole expanse of mucous membrane on which they appear is the seat of morbid change. Those authors who lay great stress upon strictures of large calibre teach that these contractions consist of separate and distinct bands. This statement is pure assumption, and is not based on studies in pathological anatomy. Therefore it is, in consequence, incorrect, the truth of the matter being as just now stated.

Fig. 49 shows a much more extensively developed form of stricture. In this instance the lumen of the urethra was considerably narrowed—approximately to about the calibre of a No. 9 or 10 sound (French). This stricture formed an annular ridge extending transversely about one-quarter way round the urethra at the junction of the membranous with the bulbous portions. In the vertical section (Fig. 49) of the urethra passing through the stricture it will be seen that the stricture is due to the development of a conical lump of newly-formed connective tissue which extends deeply into the wall of the urethra, so as to involve the membrane very extensively, almost down to the albuginea. This mass of connective tissue is very dense, and forms a fairly rigid body, and altogether it has the structure resembling cicatricial tissue. The interlacing strands of dense fibrillated fibres composing the mass pass in several directions: many of them pass circularly about the urethra, while others run up and down the canal for a short distance. Over the centre of the stricture the urethral surface is elevated in a conical point, while on either side the epithelium is somewhat thickened. At the right-hand side of the drawing the mucosa is thickened, and some newly-formed vessels pass up vertically toward the surface, as is generally the case in the skin.

This latter stricture is in striking contrast to the previous one in its lack of elasticity, extensive involvement of the urethral wall, and correspondingly greater degree of narrowing of the urethral canal. It is merely necessary to say that in this case only a limited portion of the lumen of the urethra was involved, and it is here portrayed and described in order that the pathological condition can be placed in contrast with

the healthy tissues around it. In cases in which the process is deeper and denser the same pathological conditions are presented. As the stricture increases in extent and depth the same cicatricial tissue is formed, going down as far as the tunica albuginea, and even involving it and surrounding the whole lumen of the urethra.

This form of stricture is known in clinical practice as the inodular stricture, which, when fully developed, involves a greater or less segment of the urethral canal in its totality.

True stricture of the urethra, then, is the outcome of gonorrhœal inflammation, which results in a cirrhotic periurethritis and cavernitis.

The morbid process in chronic posterior urethritis is essentially the same as that which affects the anterior urethra—namely, a small-cell exudative inflammation into the submucous connective tissue. This small-cell infiltration may be superficial and only involve the connective-tissue layer, or it may extend deeper into the structural parts of the prostatic urethra. In the superficial form of infiltration the lesion only involves the upper layers of the subépithelial connective tissue, and does not result in much condensation of the membrane. In the deeper form the whole subepithelial stratum is involved, and the caput gallinaginis, the sinus pocularis, the openings of the ejaculatory ducts, and the glands of the posterior urethra may also be more or less implicated in the cell-infiltration, and their structure and function more or less damaged and impaired. All these structures may be invaded in precisely the same manner as the racemose mucous glands of the anterior urethra are. These pathological changes must be remembered in cases of spermatorrhœa, prostatorrhœa, and in functional disturbances of the general sexual apparatus. Where this cell-infiltration is very extensive and deep the prostatic urethra becomes more or less callous and dense. The picture seen by the naked eye of chronic posterior urethritis is sometimes a granular condition due to epithelial thickening, and perhaps a slightly warty condition due to the presence of minute new vessels covered with thickened epithelium. In later stages the caput gallinaginis is seen to be enlarged and covered by callosities formed by the heaping up of pathological epithelial layers. As a result of these lesions we find evidences of a persistent desquamative catarrh. Owing to these changes the dilatibility of the prostatic urethra is somewhat impaired, and its lumen is perhaps slightly impinged upon by the epithelial thickening and by the increased size of the caput gallinaginis; but there is no such condition (though the parts may have even become cirrhotic) of stricture, such as we find in the anterior urethra. In the posterior urethra there seems to be a tendency to the condensation of the tissues, without much decrease in the lumen of the canal.

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## CHAPTER VII.

## THE ETIOLOGY OF GONORRHOEA.

THE cause and origin of gonorrhœa constitute a question which has almost constantly occupied the medical mind for more than a hundred years, and which has given rise to many animated and acrimonious arguments and disquisitions. In a scientific point of view it is most essential that there should be a clear and full understanding of this vitally important subject, which is commonly treated of in a biassed way or disposed of too briefly and magisterially. No subject in medicine is more worthy of careful, unprejudiced study, and for that reason I make no apologies for this exhaustive presentation.

So often in practice the etiology of gonorrhœa becomes a question which involves social, marital, and domestic relations, and so often upon its correct understanding depend the happiness, harmony, honor, and well-being of families, that a clear knowledge of it is absolutely necessary. The question of the fidelity and loyalty of wife and husband, lover and mistress, so frequently occurs, resulting from some purulent discharge from the genitals of the male and the female, that it is one of the fundamental subjects in medicine concerning which the physician should have clear, practical views.

There is no longer any ground for claiming that gonorrhœa is simply a catarrhal inflammation. It has been clearly and fully demonstrated that it is a typically virulent process, and that its essential virus resides in the action of one microbe, the gonococcus, and that other micro-organisms also act as virulent agents and causes. Though these facts have been proven beyond doubt or cavil, there are yet many gaps in our knowledge as to how gonorrhœa originates in many cases. There is to-day an easy-going, self-satisfied assertiveness on the part of the more radical of virulists to the effect that the question is settled and the case closed. But we shall see in the progress of this chapter that, though much has been learned, and though a flood of light has been thrown on the subjects of the origin and nature of gonorrhœa, there still remains much to puzzle us, much yet to be solved, and much to be reconciled by patient clinical observation, supplemented by broad studies in bacteriology over a very wide field.

It will be seen farther along that, although the virulent nature of gonorrhœa has been demonstrated, there are many strong and vital points in the doctrines of the non-virulists which have been passed over, ignored, and belittled by the ultra-virulists. I shall endeavor to present our knowledge on this subject in an impartial and unbiassed manner, and shall only draw such conclusions as are clearly warranted in the general survey. To this end a statement and analysis of the researches and views of the various observers who have contributed to this subject are necessary. By a scientific and an historical study we may put ourselves in possession of much knowledge which has until now not been collated or formulated.

For many years the opinion was held by the advocates of its virulent



origin, though it lacked demonstration, that gonorrhœa was caused by a virus animatum or formed ferment. In 1837, Donn <sup>1</sup> claimed that an infusorium called by him the trichomonas vaginalis was found in vaginal pus, and that it was the cause of infection in coitus. This micro-organism is a habitat of the normal vagina, and has no pathogenic influence. Jousseau <sup>2</sup> in 1862 claimed that the alga genitalia, discovered by him, was the cause of gonorrhœa. In a similar strain, Salisbury<sup>3</sup> in 1868 claimed that his own discovery, the fungus which he called crypta gonorrh ica, was the origin of the disease. In the same year Hallier claimed that a fungus discovered by him, and called the coniothecium, was the true *materies morbi*. As a matter of history only, it may be mentioned that Thiry put forward the claim that gonorrhœa was due to a granular virus. This theory was largely based on the observation of granulations on the urethral and ocular mucous membranes as a result of gonorrhœa. It is shown elsewhere that these granulations are pathological results of the gonorrh eal process. Thus it will be seen that no real pathogenic micro-organisms had been found, but that accidental infusoria and inert cocci had been seen, and were by some looked upon as pathogenic.

In 1879, Neisser<sup>4</sup> published a short and modest paper which marks an epoch in the history of gonorrh ea. In this paper he claimed that by means of Koch's staining methods, and the microscope, using a lens of high power and oil-immersion, he had found in the gonorrh eal pus of thirty-five cases of from three days' to thirteen weeks' duration a micro-organism which he called the gonococcus. He claimed that in each case this organism was found, and no others, and that it was not found in the pus derived from other sources nor in the simple leucorrh eal secretion. He found it also in the vaginal discharge of two young girls who had been assaulted by a man suffering from gonorrh ea, in the pus of seven cases of ophthalmia neonatorum of from one to six weeks' duration, and in two cases of gonorrh eal ophthalmia in adults.

Neisser's claims were soon verified and supported by a large number of observers, notably Weiss,<sup>5</sup> Bokai,<sup>6</sup> Welander,<sup>7</sup> and Bumm,<sup>8</sup> who found the gonococcus in gonorrh eal pus of the urethra. In like manner, Haab,<sup>9</sup> Krause,<sup>10</sup> Kroner,<sup>11</sup> Leopold and Wessels,<sup>12</sup> and Zweifel,<sup>13</sup> and others endorsed

<sup>1</sup> *R  cherches microscopiques sur la Nature des Mucus*, Paris, 1837.

<sup>2</sup> "Des V  g  taux parasites de l'Homme," *Th  se de Paris*, 1862.

<sup>3</sup> "Description of Two New Algid Vegetations, one of which appears to be the specific cause of Syphilis, and the other of Gonorrh ea," *Am. Journ. Med. Sciences*, Jan., 1868, p. 17.

<sup>4</sup> "Ueber eine der Gonorrh  e eigenth  mliche Micrococciform," *Centralblatt f  r die med. Wissenschaften*, No. 28, 1879.

<sup>5</sup> "Le Microbe de Pus blennorrhagique," *Th  se de Nancy*, 1880.

<sup>6</sup> "Ueber das Contagium der acuten Blennorrh  e," *Allgem. med. Centralzeitung*, No. 74, 1880.

<sup>7</sup> "Quelque R  cherches sur les Microbes pathog  nes de la Blennorrhagie," *Gazette m  dicale de Paris*, 1884, pp. 267 et seq.

<sup>8</sup> *Der Micro-organismus der Gonorrh oischen Schleimhaut Erkrankungen*, "Gonococcus Neisser," Wiesbaden, 1887.

<sup>9</sup> "Der Micrococcus der Blennorrh ea Neonatorum," *Festschrift*, Wiesbaden, 1881.

<sup>10</sup> "Die Micrococcen der Blennorrh ea Neonatorum," *Centralblatt f  r pract. Augenheilkunde*, 1882, pp. 134 et seq.

<sup>11</sup> "Zur Aetiologie der Ophthalmoblennorrh ea Neonatorum," *Archiv f  r Gynecologie*, xxv., 1884, pp. 109 et seq.

<sup>12</sup> "Beitrag zur Aetiologie und Prophylaxe der Ophthalmoblennorrh ea Neonat.," *ibid.*, vol. xxiv. pp. 92 et seq.

<sup>13</sup> "Zur Aetiologie der Ophthalmoblennorrh ea Neonator.," *ibid.*, vol. xxvi. pp. 318 et seq.

Neisser's claim that the gonococcus was the *materies morbi* in gonorrhœal ophthalmia, and demonstrated by numerous observations and confrontations that the eye-infection of the many children reported was caused by gonococci-containing pus which was present in the genital tract of the mothers.

Since the publication of Neisser's original essay a multitude of papers have appeared relating to the gonococcus. Many of these papers are by able men, and are of value as cumulative evidence only; but still more of them are the lucubrations of inexperienced and unskilful physicians. It is well, therefore, to ignore much that has been written, and to consider only the essays which we may term magisterial.

Neisser's earlier observations were wholly microscopical, but in a second paper, published in 1882, he speaks of attempts which were not successful to cultivate the gonococcus. Claims were made by Bokai (1880) and Bockhart (1883) that they had cultivated the gonococcus and had inoculated it with success. Bokai claimed that with the product of his cultures he inoculated the urethræ of three medical students, who were thereby infected with gonorrhœa. Bockhart inoculated a fourth culture on gelatin into the urethra of a paralytic, in whom he produced urethritis, cystitis, and pyelitis. The man died ten days after of pneumonia. It has within a few years been clearly shown that the gonococcus can only be cultivated upon human blood, blood-serum alone, or in combination with peptone-agar; consequently, it is fair to assume that the micro-organisms cultivated by Bokai and Bockhart were not gonococci at all, but some form of pus-producing cocci. These observations, however, have much clinical importance in the fact that quite early in the history of the bacteriology of urethral discharges they showed that other organisms than the gonococcus can produce suppuration in the urethra. It is therefore necessary to emphasize the statement that no reliance whatever can be placed on cultures obtained with any other media than those just mentioned—namely, human blood or blood-serum alone or in combination with agar-agar or peptone-agar. Where other culture-media have been used some other organism than the gonococcus has been cultivated. Fränkel<sup>1</sup> very tersely says: "The gonococcus belongs to the most incarnate parasites inhabiting the human body, and the conditions of its existence outside of the latter are at any rate very restricted."

Up to the year 1885 the recognition of the gonococcus had been only made by means of the microscope. The efforts of many observers to cultivate the micro-organism had failed or had led to false results, as we have seen, for the reason that the proper cultivating medium had not been used. Neisser himself fell into error when he claimed that he had cultivated a coccus on flesh-peptone gelatin, which was the gonococcus, but which was in all probability a non-pathogenic diplococcus. The first reliable experiment of inoculating the human subject with the cultivated gonococcus was made by Bumm, who introduced a second culture into the urethra of a female previously healthy as to her genitals. On the third day a burning pain was felt on passing water, and gonococci were found in the epithelium of the urethra. A characteristic gonorrhœa followed, the acute stage of which lasted three weeks. Daily examination of the discharge showed the presence of gonococci. Though this experiment

<sup>1</sup> *Text-book of Bacteriology*, New York, 1891, pp. 330 et seq.

seemed striking in result, it was not convincing, for the reason that only a *second* culture had been used.

Flügge<sup>1</sup> expressed himself as follows regarding this experiment: "In this instance, notwithstanding the fact that no pus-cells were found in the culture on microscopical examination, we cannot entirely put aside the objection that perhaps the cocci in the urethral discharge were simply carried over, especially as the first transference upon the artificial culture-medium was made with relatively large masses." To settle all doubt, Bumm made a second experiment, and in it used the twentieth culture of the gonococcus on human blood-serum, which he had impregnated with the pus of gonorrhœal ophthalmia. The patient was also a woman, healthy as to her genitals. The infecting culture was placed in her urethra, care having been taken that no other infection could occur. In about two days the urethral mucous membrane was seen to be red, and from it a small quantity of cloudy serous fluid exuded, which under the microscope was seen to contain gonococci and epithelial and pus-cells. A typical gonorrhœa was produced. This, then, is the first satisfactory and unimpeachable experiment by culture, which proved the gonococcus to be the pathogenic agent in gonorrhœal infection. Owing to the great care and skill necessary, and the great difficulty experienced in cultivating the gonococcus, many observers have failed in their efforts to thus isolate it.

Aufuso<sup>2</sup> sterilized and coagulated the fluid taken from an inflamed knee-joint and inoculated it with active gonorrhœal pus. Cultures were successfully made, and from the tenth generation he inoculated the urethra of a healthy man, using a portion the size of a pinhead. In two days a muco-purulent discharge appeared, which was the forerunner of acute gonorrhœa. In the secretion characteristic diplococci (gonococci) were found. Cultures on gelatin remained sterile.

Wertheim,<sup>3</sup> however, has lately added much to the question of the pathogenic nature of the gonococcus and has made some very important advances in its prompt and ready cultivation, which have been accepted by Bumm as reliable and confirmed by Gebhard.<sup>4</sup> Taking the pus of gonorrhœal salpingitis, this observer has cultivated it according to his method, and with the product has by inoculation into the human urethra produced gonorrhœa in five cases. Thus we have ample proof of the virulence of the gonococcus when produced by cultures. It will, therefore, be seen that the gonococcus thrives with equal luxuriance and acts with equal virulence in the conjunctival and urethral mucous membranes. The observations of the ophthalmological investigators already mentioned have clearly shown that gonococci-containing pus from the mother's genitals causes, under favorable circumstances, virulent ophthalmia in the eyes of their new-born children.

In clinical practice Welander<sup>5</sup> studied twenty-five cases of men suffering from gonorrhœa in confrontation with the women from whom they derived the infection, and in each instance found the gonococcus in the

<sup>1</sup> *Die Mikro-organismen*, 2d ed., p. 158.

<sup>2</sup> *Riforma Medica*, 1891, anno vii., vol. i. pp. 328 et seq.

<sup>3</sup> "Die Ascendirende Gonorrhœa beim Weibe, etc.," *Archiv für Gynækol.*, 1892, vol. xlii. pp. 1-86, and "Zur Lehre von der Gonorrhœe," *Verhandl. der Deutsch. Gesselsch. für Gynæk.*, Leipzig, 1892, iv. pp. 340 et seq.

<sup>4</sup> "Der Gonococcus Neisser auf der Platte und Reinculture," *Berl. klin. Wochenschrift*, 1892, No. 11.

<sup>5</sup> *Op. cit.*



secretions of both sexes. Such uniformity of result, however, it must be admitted, is little less than marvellous. This observer also introduced gonococci-containing pus into the urethræ of three men. The result was gonorrhœa in its typical form in two days, in the secretion of which gonococci were found. Bumm also speaks of a case in Rinecker's clinic in which gonococci-containing pus was introduced into the human urethra, with the effect of promptly producing typical gonorrhœa.

The foregoing evidence is further supported by innumerable observations made by very many observers, who constantly found gonococci in the pus of true acute gonorrhœa.

There is further certain negative evidence which demands our attention, since it is both interesting and important. Thus, Kroner and Zweifel, who by clinical observation and inoculation had demonstrated that pus and lochia containing gonococci always produced typical gonorrhœal ophthalmia, invariably observed negative results when they inoculated the conjunctiva with vaginal secretions free from gonococci.<sup>1</sup> The experience of Weland, Leopold and Wessels, and Bumm confirmed that of Kroner and Zweifel. Bumm in a series of experiments (a) with the cervical secretion free from gonococci after the subsidence of gonorrhœa, (b) with the secretion free from gonococci of chronic gonorrhœa, and (c) with gonorrhœal secretion in which the gonococci had perished, also obtained negative results by inoculating the eye.

Neisser<sup>2</sup> in his latest essay, reaffirming his belief in the virulence of the gonococcus and its causative relation to the gonorrhœal process, lays stress upon the negative facts brought out by Sternberg,<sup>3</sup> Lundström,<sup>4</sup> Chameron and Constantine Paul,<sup>5</sup> and others. These observers, without any preconceived prejudices and with the object of producing gonorrhœa, inoculated into the human urethra in a number of cases non-specific cocci which they had cultivated upon media upon which the gonococcus will

<sup>1</sup> This absolute uniformity of negative result is so striking that it is apt to beget doubt in one's mind. This is particularly the case when we consider the results obtained by my colleague, Dr. J. A. Andrews, whom I know to be an accurate and skilled observer. Andrews says (art. "Gonorrhœal Ophthalmia," *A System of Genito-urinary Diseases*, etc., vol. i. p. 224): "The writer has examined the secretion from the vagina of the mothers of eighty-eight infants in which ophthalmia developed from fifty to seventy-two hours after birth. The gonococcus was found in two only of these cases in the mother and child, the one infant being infected at birth, and the other six days after birth through carelessness of the mother. The typical clinical picture of gonorrhœal conjunctivitis was absent in eighty-six cases; nevertheless, one eye was lost in five infants and both eyes in one infant, the disease being non-gonorrhœal." Andrews further on says that his microscopic studies have convinced him that in the majority of cases ophthalmia neonatorum is not of a gonorrhœal nature. Thus we see that the result of clinical observation is not in accord with the result of experimentation in this matter. Therefore in this particular instance, and in all essays at experimentation on the subject of urethral suppuration, we must not be too much carried away with the results claimed for experiments, the majority of which have been made by men who are champions and zealots of the gonococcus doctrine. We shall see farther on that scientific clinical observation, aided by unimpeachable microscopic skill, leads to conclusions which are more or less, and in some cases wholly, at variance with some of the claims of the gonococcus champions.

<sup>2</sup> "Ueber die Bedeutung des Gonococci für Diagnose und Therapie," *Verhandlungen der Deutschen Dermatologischen Gesellschaft*, Vienna, 1889, pp. 133 et seq.

<sup>3</sup> "The Micrococcus of Gonorrhœal Pus, etc.," *Med. News*, Jan. 20, 1883, pp. 67 et seq., and "Further Experiments with the Micrococcus of Gonorrhœal Pus, etc.," *ibid.*, Oct. 18, 1884, pp. 426 et seq.

<sup>4</sup> "Studier öfver Gonococcus," *Inaug. Dissert.*, Helsingfors, 1885.

<sup>5</sup> "Du Traitement de la Blennorrhagie considérée comme Affection parasitaire," *Thèse de Paris*, 1884.

not thrive. The experiments were made as early as 1884, when it was not known that the gonococci could only be cultivated on human blood-serum. Consequently, the culture-products they obtained were not gonococci at all, but some harmless microbe. Though these cultures of supposed gonococci were introduced freely into the urethra, no result whatever was produced in any case. Neisser further makes the important statement that he has studied the action of various cocci cultivated from gonorrhœal pus upon the human urethra, and that he has obtained absolutely negative results.

Welander's experiments also presented some striking results. He introduced into the urethræ of five men the fetid pus of balanitis which contained indifferent microbes, also leucorrhœal secretion containing a multitude of different micro-organisms, yet in no instance was any pathological reaction induced. He took the vaginal secretion of a fourteen-year-old virgin containing epithelial cells, spherical and bacilliform microbes, and introduced it into the urethræ of three men, without inducing any reaction whatever. Again, he introduced fetid purulent vaginal discharge, containing large quantities of microbes, into the urethræ of three other men, with an absolutely negative result. From three women whose urethral secretion contained gonococci, but whose vaginal secretions were free from these organisms, he took a considerable quantity of this vaginal secretion and introduced it into the urethræ of three healthy men, without any effect whatever. From the urethra of one of these women, who was menstruating at the time, he took a small quantity of the secretion and introduced it into the urethra of a healthy man. The result was the rapid induction of a true gonorrhœa, as shown by the symptoms and the presence of gonococci in the pus. A small quantity of the urethral secretion of three women, in which gonococci were present, was introduced into the urethræ of two of the men who had previously been unsuccessfully experimented upon with the pus not containing gonococci, with the result of producing gonorrhœa promptly.

Summing up the knowledge thus far presented, which may be called the creed of the gonococci-advocates, it is claimed that the following propositions are worthy of acceptance:

1. The demonstration of the gonococcus by the microscope in gonorrhœal pus.
2. Its cultivation and its production by means of experimental inoculation of gonorrhœa in the human urethra.
3. The development of gonorrhœa experimentally in the human subject by the introduction into the urethra of gonococci-containing pus from males and females.
4. Certain negative evidence which seems to, and it is claimed does, prove that secretions not containing gonococci will not produce gonorrhœa.
5. A number of indifferent microbes obtained by cultivation and falsely regarded as gonococci produced no pathological result.
6. Various purulent secretions taken from men and women not containing gonococci did not, when experimented with, produce gonorrhœa.
7. It must not be forgotten that certain microbes, supposed to have been, but which certainly were not, gonococci, in the hands of Bokai and Bockhart produced violent suppuration resembling true gonorrhœa in experiments on the human subjects. This last point has been almost

ignored, but certainly passed over, by Neisser and his followers; but it will require our attention and further elaboration again a little farther on.

Bumm, as a result of his studies (and his views are accepted in full by Neisser and many others), thinks that in the present state of medical science he is warranted in presenting the following postulates:

1. When no disinfecting treatment has been used gonococci are to be found in the secretion of every gonorrhœal mucous-membrane inflammation.

2. Secretions free from gonococci behave as non-infectious toward mucous membranes.

3. A secretion containing gonococci causes gonorrhœal inflammation in susceptible mucous membranes with absolute certainty even when used in small quantity. He further claims that *the presence of Neisser's gonococci in a secretion proves, under all circumstances and in all certainty, both the infectious origin of the disease of the mucous membrane and of the secretion poured forth, and that, conversely, a secretion free of gonococci, whatever be its origin, has no virulent properties.*

The foregoing gives a full and impartial statement of the position of Neisser and his followers. It will be seen that their claims are far-reaching, and that they are made with an absolutism which is peculiar to most new departures which break into an era of doubt and uncertainty. Until 1879 we had groped in the dark, unaided even by a ray of truly scientific light, as to the essential nature of the gonorrhœal process. Having found the gonococcus, Neisser and his followers proceeded in the most magisterial manner to claim that it, and it alone, was the pathogenic agent in the causation of gonorrhœa, and that in it resided its virulence. It was the same tendency of the human mind which actuated Ricord when, more than forty years previously, he had claimed with vehemence, in season and out of season, that gonorrhœa was a simple catarrhal process absolutely without virulence or specificity. Gonorrhœa had so long been confounded with syphilis—which is, of course, a virulent disease—that when Ricord established the non-identity and non-interdependence of the two diseases, he very promptly and truculently proceeded to deny for gonorrhœa any virulent principle whatever, and to relegate it to the group of simple catarrhs. In like manner, but in an opposite direction, Neisser and his followers, as soon as the gonococcus was revealed to them, put up the claim, which has been stated, that in the gonococcus alone resided the virulence of true gonorrhœa. But absolute statements, particularly on subjects as yet not long and broadly discussed, luckily always incite in the minds of some doubt, skepticism, and conservatism, which lead to further study and examination, and in the end to broader views and positions nearer the truth. This, naturally, is what has occurred in the matter of the gonococcus question. Neisser's far-reaching claims and assumptions have led to a broad investigation of the whole subject of the etiology of gonorrhœal discharges by many observers. As a result, it will be seen that while Neisser's main proposition as to the relation of the gonococcus to acute gonorrhœa is true in a large majority of cases, it may have its exceptions. It has also been further very clearly shown that other micro-organisms may be the pathogenic agents in urethral suppurations. It is well, therefore, not to be led by the writings of Neisser, Bumm, and others into a feeling that the question is fully and finally

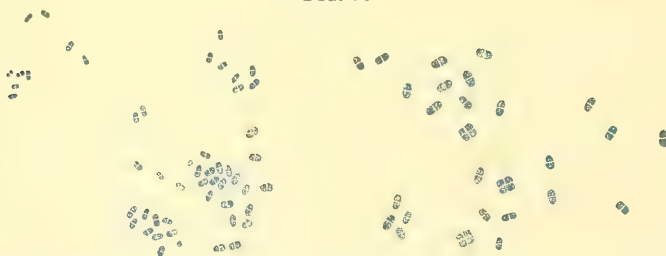


settled, but to examine into and ponder over the facts which have been brought out by those who deny, in part or in whole, the absolute specificity of the gonococcus. The question of the etiology of gonorrhœa is to-day, as we have said before, far from being on an absolutely definite and settled basis, and very much careful and extended study is yet needed to broaden our knowledge, to clear away doubt and confusion, to reconcile inconsistencies, and to fill very many important gaps.

The bolt which struck in the camp of the gonococcus-adherents, and did the most damage, was the paper of Lustgarten and Mannaberg,<sup>1</sup> which may be said to have produced consternation. These observers show that in the normal urethra a variety of micro-organisms grow. Most of these microbes are harmless parasites or saprophytes. There are three, however, which, the authors think, deserve especial attention. They are—1, a pyogenic coccus, the staphylococcus aureus; 2, a bacillus resembling the tubercle bacillus, and probably identical with the smegma bacillus; and 3, one or several species of diplococci, which resemble completely Neisser's gonococcus in shape and tinctorial qualities, especially in being decolorized by Gram's method.

The establishment of the fact that in healthy urethræ micro-organisms known to have a pathogenetic power lurk and lie dormant is of great importance in further perfecting our knowledge and in removing obscurities from many seemingly queer or anomalous cases. Besides these pyogenic bacteria there are several, if not many, others which are thought to be innocuous, but which may, perhaps, under favorable circumstances, become harmful. Lustgarten and Mannaberg's observations led to the study of this question by several other observers, who have, in the main, confirmed their statements. Thus, Steinschneider,<sup>2</sup> a pupil of Neisser, made an exhaustive study of the bacteriology of the urethra in a normal state, and also in subjects suffering from acute and chronic gonorrhœa.

FIG. 50.



Showing on the left half some groups of gonococci obtained by culture, and on the right half some groups of a so-called pseudo-gonococcus cultivated from a specimen derived from a normal urethra virgin to gonorrhœa (cultures by Dr. Henry Heiman in the pathological laboratory of the College of Physicians and Surgeons, N. Y.).

As a result, he found virulent and inert organisms in healthy urethræ, and also, like Bumm, various other organisms in gonorrhœal pus besides the gonococci. He concedes that a diplococcus, or, as it may be termed,

<sup>1</sup> "Ueber die Mikro-organismen der Normalen Männlichen Urethra, etc.," *Vierteljahresschrift für Derm. und Syphilis*, 1887, pp. 905 et seq.

<sup>2</sup> "Ueber Seine in Verbindung mit Dr. Galewsky vorgenommenen Untersuchungen über Gonococcen und Diplococcen in der Harnröhre," *Verhandlungen der Deutsch. Dermatol. Gesellschaft zu Prague*, 1889, pp. 159 et seq.

pseudo-gonococcus, which in a measure resembles the gonococcus, is found, and may lead to a possibility of doubt and error in about 5 per cent. of cases. This statement, coming direct from Neisser's laboratory, is certainly very significant.

In this connection Fig. 50 is worthy of attentive study. On the left-hand side of the figure the true gonococcus is seen, while on the right-hand side a larger, but very similar, diplococcus, arranged in groups of twos and fours, is portrayed. A comparison of these two orders of diplococci shows no visible difference except in size. It can be readily seen, therefore, that unless a person is thoroughly skilled in bacteriology he may easily fall into error in the identification of these micro-organisms.

There is still further evidence, however, in the same direction and strain.<sup>1</sup> A number of capable men have separately studied this question, and have shown conclusively that many micro-organisms are found in the healthy urethra, most of which are non-pathogenetic. There is considerable unanimity of statement that microbes very closely resembling the gonococcus, and very difficult to distinguish from it, are quite constantly found. Then, again, it is very clearly proved that such micro-organisms as the staphylococci and streptococci, whose virulence under favorable conditions is well known, have been frequently found in the normal urethra. The net results of the studies thus far made into the bacteriology of the normal and diseased urethra go to show that the gonococcus is the most constant and potent morbid agent in the production of urethral inflammations, but that other micro-organisms also play an active rôle in this direction. We have knowledge enough concerning some of these pyogenic microbes to warrant the statement that they can, and do under favorable conditions, produce urethral suppuration.

In the course of time it may be proved that certain micro-organisms found in the urethra, which are now regarded as harmless saprophytes, may also, under certain conditions, be capable of producing inflammatory changes. At present precise statements as to the pathogenic agent or agents in other than gonococci-produced urethral suppurations cannot be made. It will require much patient and accurate study by many observers to place this subject upon a clear scientific basis. All that we can do now is to place on record the experience thus far developed and the views derived from such experience.

To Aubert<sup>2</sup> is certainly due the credit of having first definitely called attention to the fact that urethral discharges are caused by other micro-organisms than the gonococcus. He made a series of observations which

<sup>1</sup> This may be found in the following essays: Giovannini: "Die Microparasiten der männlichen Harnröhrentrippers," *Centralbl. f. d. med. Wissenschaft*, 1886, No. 48; Legrain: "Les Associations microbiennes de l'Urèthre," *Annales des Maladies des Organes Génito-urinaires*, 1889, pp. 141 et seq.; Petit et Wassermann: "Micro-organismes de l'Urèthre de l'Homme," same journal, 1891, pp. 378 et seq.; Rovsing: "Die Blasenentzündungen ihre Aetiologie, etc., Berlin, 1890, pp. 60 et seq.; Hallé, "De l'Infection urinaire," *Ann. des Mal. des Org. Gén.-urin.*, Feb., 1892; Reymond: "Cystites survenues chez des Malades n'ayant jamais été Sondés," *ibid.*, Oct., 1893, pp. 734 et seq. Several observers found many micro-organisms quite uniformly; some differ from others as to the nature and character of certain microbes, but all are fairly well in accord with the statement given in the text. (Vide *supra*.) The fact is, that we have only just begun the study of the bacteriology of the healthy and diseased urethra, and that no absolute statements or any generalization whatever can yet be made.

<sup>2</sup> "De l'Uréthrites bactériennes," *Lyon Médical*, 1884, xlv. pp. 337 et seq.

convinced him that besides ordinary gonorrhœa there are certain urethral discharges characterized by the presence of bacteria which differ markedly from the gonococcus, and which may be complicated by epididymitis and cystitis. He speaks of having found in three cases a small oval and elongated coccus and bacillus. He is not certain whether this form of gonorrhœa is a type or an accidental condition due to what we now call mixed infection. The value of Aubert's work resides in the broad possibilities which it suggests, rather than in the definiteness of its statement.

Further light is thrown on the subject by a lengthy paper by Bockhart,<sup>1</sup> in which he describes and pictures certain micro-organisms which he found in urethral pus and by cultivation during the study of fifteen cases. Bockhart concludes that there is a benign acute pseudo-gonorrhœal urethritis which results from infection by bacteria of the vagina, among which most prominent are a small staphylococcus and an ovoid streptococcus. In its clinical course this form of gonorrhœa resembles that which is elsewhere described as simple urethritis.

Zeissl,<sup>2</sup> in an extended study of this question, examined the pus of seven cases of urethral suppuration, non-gonorrhœal in origin, and found diplococci resembling gonococci and other micro-organisms. Zeissl's paper is interesting and valuable in the fact that the various microscopic pictures are clearly reproduced.

Further evidence as to the origin of urethral suppurations in pus free from gonococci, and as to the existence of diplococci resembling gonococci, is furnished by a number of observers. Thus, Rauzier<sup>3</sup> details three cases of so-called gonorrhœa in the secretion of which no gonococci were found, but a larger diplococcus was present, which resembled the former.

Legrain<sup>4</sup> reports the case of a medical student who had urethritis, in the pus of which the presence of the micrococcus cereus albus of Passet was found. The woman with whom the man had cohabited was considered healthy, but she had previously suffered from retro-uterine phlegmon. In this case the supposition is warranted that perhaps infection was caused by urethral inflammation which developed the pathogenic power of a saprophyte. Legrain<sup>5</sup> further details the case of a man free from venereal disease or vegetations who, while convalescing from typhoid fever, was attacked by urethral suppuration, at one time slightly sanguinolent, which involved the posterior urethra. In the pus of this case the micrococcus pyogenes aureus and several other micrococci were found.

Castex<sup>6</sup> reports the case of a perfectly healthy boy who, having retention of urine following an operation on the knee, was catheterized, perhaps carelessly. A slight sluggish purulent urethritis was produced, in

<sup>1</sup> "Ueber die pseudo-gonorrhœische Entzündung der Harnröhre und des Nebenhodens," *Monatshefte für Prakt. Dermatologie*, 1886, pp. 134 et seq.

<sup>2</sup> "Ueber die Diplococcus Neisser's und seine Beziehung zum Tripperprozess," *Wiener klinik*, Nov. and Decem., 1886.

<sup>3</sup> "Le Gonocoque et la Dualité des Uréthrites," *Gazette méd. de Montpellier*, Nos. 7 and 8, 1888.

<sup>4</sup> "Contribution à la Diagnose du Gonococcus," *Annales des Maladies des Organ. Gén.-urin.*, 1888, pp. 523 et seq., and "Contribution à l'Étude de l'Étiologie des Uréthrites non-blennorrhagiques," *ibid.*, 1889, pp. 337 et seq.

<sup>5</sup> "Uréthrite survenue chez un Convalescent de Fièvre typhoïde," *ibid.*, 1889, pp. 291 et seq.

<sup>6</sup> "Uréthrite sans Gonocoque," *Gaz. hébd. de Méd. et de Chir.*, 2d Series, vol. xxiv. p. 358, 1887.



the secretion of which a staphylococcus was found and further cultivated. Somewhat similar in nature is the case reported by De Amicis.<sup>1</sup> This observer injected ammonia into the male urethra (being a repetition of the classic experiment of Swediaur), which produced suppuration, in the pus of which diplococci resembling gonococci were found. These diplococci were larger than gonococci, and were not found in the pus-cells. De Amicis further claims that he took pus from a child suffering from vulvo-vaginitis which was not due to gonorrhœal infection and inoculated with it the male urethra. The result was typical gonorrhœa, in the pus of which micrococci resembling gonococci were found. The experiment of Martin<sup>2</sup> is corroborative of the result obtained by De Amicis. Martin took the secretion of a child which was suffering from declining vulvo-vaginitis. Though when first observed the pus contained gonococci, it was free from the microbe at the time of the experiment. Some of the secretion was placed three-quarters of an inch deep into the urethra of a consenting hospital patient. In four days the prodromal symptoms of gonorrhœa were noted, and on the sixth day there was a profuse purulent and bloody discharge. Examination of this secretion on the tenth day showed large numbers of gonococci. Later on the man suffered from posterior urethritis.

Éraud<sup>3</sup> has for some years studied the question of the specificity of the gonococcus. As a result, he seeks to prove that the gonococcus is probably an inoffensive guest of the normal urethra. He thinks that the specificity of the gonococcus is not yet proven—that it may be a harmless saprophyte of the normal urethra capable of transformation under conditions not yet made clear. His researches have been carried on with secretions of patients suffering from gonorrhœa, prostatitis, and orchitis, and on secretions from the healthy urethræ of infants six days old, from young children, and adolescents virgin to gonorrhœa. He concludes—1. There exists in the urethræ of healthy men a staphylococcus which is capable of producing orchitis; 2. This microbe is found in children and infants; 3. This saprophyte presents the same characters as the microbe of orchitis and gonorrhœal prostatitis; 4. There is reason for supposing, if not for concluding, that all these microbes are one and the same parasites living as saprophytes in the normal urethra, and capable under unknown conditions of giving rise to the gonorrhœal process. These observations have been further put to the test and studied by Prof. Hugounenq,<sup>4</sup> who endorses Éraud's conclusions.

In this connection it is well to consider the statement of Prof. Straus,<sup>5</sup> whose knowledge and skill in bacteriology are well known. Straus reports the case of a boy sixteen years old who never had coitus, but who was a confirmed masturbator. This boy was attacked with urethritis showing

<sup>1</sup> "De la Nature parasitaire de la Blennorrhagie," *Lyon Médical*, Aug. 2, 1884, pp. 1075 et seq.

<sup>2</sup> "Vulvo-vaginitis in Children," *Journal of Cutaneous and Gen.-urin. Diseases*, Nov., 1892, pp. 415 et seq.

<sup>3</sup> "Des Raisons qui semblent militer en faveur de la non-spécificité du Gonocoque, etc.," *Bulletin de la Société française de Derm. et de Syph.*, vol. ii., 1891, pp. 231 et seq.

<sup>4</sup> "Sur un Microbe pathogène de l'Orchite blennorrhagique," *Annales des Maladies des Organes Génito-urinaires*, Juin, 1893, p. 465.

<sup>5</sup> "Présence du Gonococcus de Neisser dans un Ecoulement urétral survenu sans rapports sexuels," *Archiv. de Méd. expér. et d'Anatomie path.*, 1889, i. pp. 326 et seq.

acute symptoms. On four occasions, at intervals of time, Straus found in the urethral pus gonococci in the pus-corpuscles and on the epithelial cells. He thinks this case is important as regards the view held by many, that gonorrhœa may be contracted without sexual exposure or contagion as a result of great irritation of the urethra. Straus advances the proposition that perhaps the gonococcus is a normal and inoffensive guest of the urethral canal, and that under the influence of irritation it becomes pathogenic. He thinks there may be a similarity in the action of the gonococcus to that of the pneumococcus of Fränkel, which usually remains dormant in the mouth and air-passages until some favoring causes call into play its virulent action.

I have myself studied the bacteriology of urethral pus very extensively, and I am thoroughly convinced that urethral suppuration is produced by other microbes than the gonococcus. I have seen cases of mild gonorrhœa in the secretion of which I have found the staphylococcus and a small streptococcus. In many of these cases the clinical picture of simple or mild urethritis was present, but I have seen three instances in which the suppuration and subjective symptoms were such that a diagnosis of virulent gonorrhœa was warranted. These cases, moreover, ran a rebellious course, and one case was complicated by severe typical posterior urethritis and epididymitis. Careful examination of the pus showed an absence of the gonococcus and the presence of a streptococcus. A patient attending at my college clinic presented the typical symptoms, objective and subjective, of acute gonorrhœa. In the pus taken from this man's urethra Dr. Van Gieson found by the microscope the streptococcus pyogenes, which he was able to cultivate on human serum-agar and on glycerin-agar. No experimental inoculations were made, for the reason that the cultures died so quickly. Other observers, Bockhart, De Amicis, and Aubert, have also noted the occurrence of seemingly virulent gonorrhœa in the pus of which no gonococci could be found, but, on the contrary, a streptococcus or a staphylococcus. We have already seen that the injection of ammonia (De Amicis) may cause urethral suppuration in the pus of which a microbe can be found, and the same result sometimes follows the passage of a sound. In the pus of a case seen by me of a urethral discharge induced by intemperate endoscopy at the hands of one of its enthusiasts (an anterior and posterior urethritis of severe type, but of short duration, having been produced), Prof. Prudden found by the microscope and by cultivation micrococcus ureæ in large quantities. Few men affected with true gonorrhœa suffered more than this patient did, who had had no urethral inflammation for many years previously. I have in many other cases of traumatic urethritis found cocci other than the gonococci.<sup>1</sup>

<sup>1</sup> In these cases it is most probable that the trauma of the urethra produces a hyperæmia and succulence of the cells which are favorable to the morbid activity of its saprophytic microbes and guests. An organism which was harmless becomes potential and pathogenic, and a suppurative inflammation is induced. It is not unreasonable also to suppose that morbid microbes may be introduced into the urethra upon unclean instruments. Legrain ("Des Uréthrites non-blennorrhagiques," *Annales des Maladies des Org. Genito-urinaires*, 1889, pp. 337 et seq.) states that he carefully introduced a bougie smeared with the second culture of the micrococcus pyogenes aureus into the bladder and produced no result. A week later he repeated the same experiment, using slight violence, and as a result a mild and ephemeral form of suppuration was produced in thirty-six hours. He failed in a similar manœuvre when he used the micrococcus pyogenes albus. Legrain recalls the fact that Voilemier introduced into the urethra of two patients a bougie

As further bearing on this subject it is well to give the results of some very careful observations made by Hogge<sup>1</sup> under Guyon's auspices in the Necker Hospital laboratory. Hogge in two cases very clearly shows the difficulties and drawbacks experienced in examining chronic urethral discharges and pus from the bladder and in distinguishing the microbes there found from the gonococcus. The first case was that of a man aged sixty-five who never had had gonorrhœa, but who had a purulent secretion following the introduction of a sound. This pus contained a diplococcus found in the cell-substance and scattered over the field, which resembled in its various features the gonococcus. It was also decolorized by Gram's method. It could be cultivated on gelatin, agar-agar, and in bouillon. The second case was one of cystitis following operation for a bladder neoplasm in a patient who had gonorrhœa twenty years before. In the urinary sediment a similar microbe was found, which could be cultivated on the media just mentioned. The author shows that in chronic discharges there are microbes which by their form, size, intracellular position, their mode of grouping, their number, their mode of coloration and decoloration, resemble the gonococcus. These microbes can be cultivated on gelatin, agar-agar, and bouillon, whereas the gonococcus will not grow on these media. Consequently, in such chronic cases we cannot affirm that a certain microbe is the gonococcus, and can only ascertain its real nature by cultivation. In this connection it is well to remember that in the normal urethra Lustgarten and Mannaberg found a coccus resembling the gonococcus.

As a result of the accumulated knowledge upon this whole subject up to 1889, Neisser<sup>2</sup> has had to concede that it is possible, under certain circumstances, that other micro-organisms than the gonococcus may cause purulent urethritis. But he strenuously contends that these forms of urethritis are all clinically absolutely different from true gonorrhœa. He states in this paper (1889) that since 1879 every case of urethritis in his private, polyclinic, and clinical practice has been examined for the gonococcus, and that only two cases of purulent urethritis, appearing in an acute form and caused, as it seemed, by infection, have been observed which did not positively show the gonococcus. In these cases, moreover, no pseudo-gonococci were found.

In his latest paper, however, Neisser<sup>3</sup> concedes that it is often exceedingly difficult to establish the difference between gonococci and similar diplococci. Then he details the case of a man who several years before his marriage had gonorrhœa and double epididymitis, and who, after frequent coitus with his wife, had a profuse acute purulent discharge. Yet on examination of the pus no microbes of any kind could be found. He further cites the case of a man who for nine years had cohabited only

smeared with the pus of an abscess of the thigh and of a cold abscess of the glands of the neck, and that no reaction followed in either case, though the bougie remained *in situ* two hours. In these cases it seems to me very probable that an old pus, poor in microbes or whose microbes were in a state of decadence, was used, and that mechanical violence was not produced.

<sup>1</sup> "Gonocoques et Pseudo-gonocoques," *Annales des Malad. des Org. Génito-urin.*, April, 1893, pp. 281 et seq.

<sup>2</sup> "Ueber die Bedeutung der Gonococcen für Diagnose und Therapie," *Verhandl. der Deut. Dermat. Gesellschaft gehalten zur Prag, Vienna, 1889*, pp. 133 et seq.

<sup>3</sup> "Welchen Werth hat die Mikroskopische Gonococcenuntersuchung?" *Deut. med. Wochenschrift*, Nos. 29 and 30, 1893.



with his wife, yet who came to him with a urethritis which from its symptoms he would have been led to pronounce gonorrhœal. He could find no gonococci in the secretion, but, on the contrary, numerous small diplococci. This attack was cured, but five or six days after each intercourse with his wife the patient was similarly attacked. The foregoing very clearly proves that Neisser to-day does not consider his first position as firm as he in earlier years thought it to be.

The results obtained by Neisser (and his followers are equally as radical in their statements) are certainly startling, and from their uniformity of success as to the gonococcus they beget a spirit of skepticism in conservative minds. Seeing that a number of disinterested observers—and myself included—in much shorter periods of research than ten years have found in numerous cases other micro-organisms than gonococci in acute gonorrhœa, the suspicion is warranted that a rigorous differentiation was not practised by Neisser and others.<sup>1</sup> When such dogmatic statements are made as emanate from the ardent advocates of the gonococcus, particularly the one that this microbe is the sole and essential morbid agent in acute gonorrhœa, there should be ample evidence offered that full and sufficient care has been taken in establishing the presence of the gonococcus in the vast number of cases claimed, and also that the presence of other pathogenic microbes has been looked for and not found. Thus far, this certainly has not been done, and it is safe to say that the question can never be settled by microscopic examination alone. Cultures of urethral pus in very many cases and by many men working separately are absolutely necessary toward a solution of this question. Then, again, much experimental inoculation will be required to confirm the knowledge gained by the study of the cultures.

Reviewing, therefore, the question of the pathogenesis of gonorrhœa and of miscellaneous urethral discharges in the light of our present knowledge and in a judicial spirit, we are warranted in drawing certain conclusions and of stating certain assumptions which may fairly be drawn from facts and statements now in our possession:

1. In a large proportion—perhaps in a large majority—of cases of acute purulent gonorrhœa or urethritis the pathogenic agent is the gonococcus. (Bumm, it will be remembered (*vide supra*), claims that in every case it is found.)

2. In a small proportion of cases of acute purulent gonorrhœa or urethritis the infecting agent or agents seem to be, in the absence of the gonococcus, one or more of the pyogenic microbes, the staphylococcus and the streptococcus, and perhaps others whose virulency is not yet demonstrated. (Bumm claims that secretions free from gonococci are non-infectious.)

3. In many cases of mild urethritis in virgin subjects, and in those who have had true gonorrhœa some time before, these micro-organisms

<sup>1</sup> I have several times been struck by the looseness of statement of the ultra-ardent advocates of the gonococcus, and by their easy-going, routine methods of microscopical examination. They rarely ever fail to see this microbe in any specimen which they examine, even when taken at haphazard. With great celerity they dry and stain the secretion, place it under the lens, and in an instant claim that they see the gonococcus. The case is then settled for them. Thus they continue in case after case. I suspect that if the truth were really known regarding statements and histories of cases, in fully 80 per cent. the gonococcus was not really found, although it was claimed to be clearly seen.

and others more or less well known to us are in all probability the causes of urethral suppuration, the tissues being rendered by coitus favorable to their pathogenic action.

4. Some cases of mild or more severe relapsing gonorrhœa, with abundant purulent secretion, may be due to the renewed activity of gonococci, which may have remained latent and dormant in the urethra, but which, under favoring circumstances, had again taken on their virulent action. In some of these cases the symptoms are much less severe than in the first attack. The inference, then, is that the tissues are less susceptible or that the virulence of the gonococcus has become attenuated.

5. Many cases of more or less severe relapse after true gonorrhœa are not due to the gonococcus, but to the other less virulent microbes. Then, again, the hyperæmia left after an attack of gonorrhœa may increase to an active purulent inflammation as a result of stimulation or sexual excesses, microbic action being entirely absent. This is probably the condition in most cases of acute or mild urethritis in which neither gonococci nor other micro-organisms are to be found.

6. It is clearly proved by clinical observation and experimental inoculation that pus or any secretion (*e. g.* the lochia) containing gonococci may, and does, produce a virulent suppuration in susceptible mucous membranes, most commonly of the urethra and of the eyes.

7. The observations of Lustgarten and Mannaberg, of Steinschneider and Galewsky, and of others already mentioned, go to show that pathogenic and non-pathogenic micro-organisms are found as inoffensive inhabitants of the normal urethra. There is sufficient evidence in our possession to-day to warrant the belief that under the favoring conditions of sexual excitement and excess these micro-organisms become hostile and virulent and give rise to urethral suppurations of both mild and severe types.

8. The statement is further warranted that these saprophytic agents may cause a purulent inflammation in a urethra congested, ulcerated, or infiltrated as a result of a previous gonococcus inflammation. There is no doubt whatever that many cases of relapse of gonorrhœa are not caused by a renewed gonococcus-infection nor by the relighting into activity of latent hibernating gonococci, but that they are due to the morbid action of the less virulent microbes, denizens of both healthy and damaged urethræ.

9. The advocates of the gonococcus theory go too far when they claim that this micro-organism so frequently remains dormant and hiding in the urethra after the cessation of a true gonorrhœa. The gonococcus is essentially a virulent agent and a disturber of the peace, and for reasons and from facts to be given later it is fair to assume that it disappears from the urethra upon the final cure of true gonorrhœa. It is the exception, rather than the rule, that it should remain dormant in the urethra for a long time.

10. Most of the cases of gonorrhœa or urethritis which are the result of chemical or mechanical irritation or violence are in all probability due to the morbid action of a number of micro-organisms so constantly found in normal and chronically and very subacutely inflamed urethræ. This statement is very clearly proved by the evidence of Legrain, De Amicis, Castex, myself, and others. In some cases these chemical and mechanical

irritants provoke an exacerbation of the virulence of the gonococcus. In these cases, however, it is probable that the virulent urethritis is not yet at an end or that the gonococcus had not yet thoroughly disappeared.

11. The studies of Éraud, Hugounenq, and D'Arlhac are worthy of thought and investigation, since they put the gonococcus question in a new light. They think that this micro-organism is a denizen of the normal and diseased urethra, and that under favorable conditions it takes on virulent action. It will be seen a little farther on that it is frequently very difficult, and in many cases impossible, to find gonococci in the secretions of a woman with whom a man suffering from true gonorrhœa has had coitus. Many cases seem to prove that the infection of the man (he even having a healthy urethra) is due to causes inherent in himself. Neisser and his followers in a magisterial manner claim that gonococcus-infection in the male urethra in a virgin subject always is derived from a secretion of the female consort containing gonococci. We shall see, later on, that this view is at variance in many cases with clinical facts, and that Éraud's proposition may in the end lead to a partial or full explanation of the subject. There are, however, very many cases (as we have seen) of gonorrhœa which were derived from a similar process in the female.

12. The term "pseudo-gonococci" does not apply to any particular micro-organism, but it is being applied rather loosely to any and all microbes capable of producing urethral suppuration.

The net outcome of all this knowledge is, that gonorrhœa is a disease induced by micro-organisms, the condition of the affected mucous membranes being such as to favor their pathogenic action. It is therefore a virulent disease, its chief pathogenic agent being the gonococcus. Other micro-organisms also give rise to urethral suppuration, sometimes as violent and as much complicated as true gonorrhœa. In these rather unusual cases nothing but microscopical examination can determine that the morbid process is not caused by the gonococcus. The suppurations caused by a number of pus-producing microbes, some of which have been called pseudo-gonococci, are usually milder in character and shorter in duration than the gonococcus-infection. They are simply cases of a milder form of urethral infection.

These views are less radical and sweeping than those of Neisser's school, which are well summed up in the following quotation from Finger,<sup>1</sup> who says: "Blennorrhœa (gonorrhœa) is a virulent process whose virus is the gonococcus, and we therefore recognize only one condition as necessary to the production of blennorrhagic urethritis as of all blennorrhagic affections—namely, the conveyance of gonococci in any vehicle, which usually, but not always, consists of mucus or pus derived from another blennorrhagic affection. Blennorrhagic urethritis can only develop by inoculation with gonococci. Its chief source is the transmission of blennorrhagic pus from the female sexual organs, and therefore coitus with a woman suffering from blennorrhœa of the sexual organs is the main source of blennorrhagic urethritis in the male. . . . Blennorrhœa of the sexual organs in the female is therefore the most important source of blennorrhagic urethritis in the male, and coitus is the means of infection."

<sup>1</sup> *Die Blennorrhœe der Sexualorgane und ihre Complicationen*, 2d ed., Leipzig und Wien, 1891, p. 37.



The practical outcome of this doctrine is that whenever a man has a purulent discharge in which gonococci are to be found the conclusion is surely and logically warranted that he derived the infection from a woman similarly infected. In other words, this theory of the ultra-adherents of gonococci-virulism proclaims in its essence that gonorrhœa originates only in gonorrhœa.<sup>1</sup> The general acceptance of this doctrine can only result, in very many cases, in suspicion, rude and violent recrimination, estrangement, unhappiness, dishonor, and even suits for divorce in families and in society between males and females, husbands and wives, lovers and mistresses, between whom there may not be any breach of fidelity or lack of loyalty whatever. Such a doctrine is brutal in the extreme, and is largely the outcome of too great reliance being placed upon the results furnished by the microscope. It is another instance of the absolutism of thought which so often pervades the human mind when light is suddenly thrown on a hitherto dark subject. To enthusiasts the subject then seems clear and settled; any doubts, uncertainties, inconsistencies, and gaps in knowledge are by them ignored or passed over unconsidered.

There can be no doubt that many men contract gonorrhœa from women suffering from a specific gonococcus-infection of some part of their genital tract, and, on the other hand, women are infected by men similarly infected in their urethra. But there is met with, particularly in private practice even among nice people, a class of cases in which men contract gonorrhœa from women who claim to be and seem to be perfectly healthy. The latter state that they never had the classical symptoms of gonorrhœa, and prior to the infecting coitus and after it considered themselves perfectly healthy. On this subject we have some very strong evidence which to-day by the Neisser school is looked upon as false and obsolete. No one certainly studied this question more intelligently and for a longer time than Ricord, and yet to-day his views with many go for naught. Let us look at these old views and see whether there is not at least *some* truth in them. Ricord<sup>2</sup> says: "When we investigate with the greatest care the determining causes of the most characteristic gonorrhœa, we are forced to admit that the gonorrhœal virus is absent in the majority of cases. There is nothing more common than to find that women who have occasioned the most intense, the most persistent gonorrhœas, accompanied with the most characteristic gonorrhœal complications, were only affected with uterine catarrh, sometimes hardly purulent. Quite often the menstrual flux appears to have been the sole cause of the disease. In a great number of cases we can discover nothing unless perhaps errors in diet, excess in sexual intercourse, the use of certain drinks or of certain articles of food. Hence the frequent belief of patients, which is often correct, that they have contracted their clap from a perfectly healthy woman. Upon this point I am assuredly familiar with all sources of error, and I have the pretension to say that no one is more guarded than myself against the various forms of deceit which beset the path of the observer; yet I confidently maintain the following proposition: *women frequently give gonorrhœa without having it themselves*. When one studies gonorrhœa without prejudice, without precon-

<sup>1</sup> In his edition of 1888, Finger went so far as to say, "It is an evident condition *sine quâ non* that the woman from whom a man acquires blennorrhagic urethritis must herself suffer from blennorrhœa." He omits this sentence in the 1891 edition.

<sup>2</sup> *Lettres sur la Syphilis*, 3d ed., 1863, pp. 46 and 47.

ceived notions, he is forced to admit that it originates from causes that give rise to inflammation of other mucous membranes."<sup>1</sup>

On this subject Fournier<sup>2</sup> remarks: "With the purpose of elucidating this difficult question of the origin of gonorrhœa I have made during many years a great number of *confrontations* of patients, to whom I believe I have given the most minute attention. More than sixty times I have examined women from whom true gonorrhœas have been contracted under conditions which could scarcely leave any doubt as to the origin of the disease. Now, from this study I am convinced that the opinion of my master (Ricord) is the only true one, and the only one which conforms to the facts of daily observation. Ricord says *frequently* women give gonorrhœa without having it: in my opinion he should have said *most frequently*. For one gonorrhœa which results from contagion (in the precise sense of the word), there are three at least in which contagion plays no part. According to my observation, a man is more often responsible for his gonorrhœa than than the woman from whom he seems to have contracted it: *he gives himself gonorrhœa more frequently than he receives it.*"<sup>3</sup>

<sup>1</sup> It is never amiss to quote Ricord's remarks, for they always show a profound knowledge of human nature and of medicine. His recipe for contracting gonorrhœa is graphic, comprehensive, and suggestive. He says: "Select some woman of a pale, lymphatic temperament—a blonde is better than a brunette—and the more white she has the better. Take her out to dine; order oysters first, and don't forget asparagus afterward. Drink often and freely: white wines, champagne, coffee, liqueurs,—they are all good. After dinner dance a while, and have your friend dance with you. Get well heated during the evening, and quench your thirst without stint with beer. At night play your part valiantly: two or three times would not be too much, but more would be better. The next morning do not forget to take a prolonged hot bath; moreover, do not omit an injection. This programme having been conscientiously followed out, if you don't have a clap, some good deity must have saved you."

<sup>2</sup> Art. "Blennorrhagie," *Nouveau Dictionnaire de Méd. et de Chirurgie pratique*, vol. v., 1866, pp. 152 et seq.

<sup>3</sup> This statement merits even more emphasis than is given to it in the text, since the conditions underlying the question are to-day better understood. Now, we know positively that in normal urethræ there are many and varied hibernating and harmless micro-organisms which under conditions of irritation of the tissues become active and pyogenic. We further know that very many men have chronically-damaged urethræ, due to local exulcerations, thickening, and hyperæmia, subacute inflammation of follicles and crypts, granular and papillomatous conditions, ulcers, warts, polypoid growths, and even stricture—conditions ever ready to fall into inflammation. Now, these may exist with no symptoms and little if any perceptible discharge. In these cases of damaged urethræ there is good evidence in hand that saprophytic microbes may also be present in innocent inactivity. Now, with these facts in mind it is easy to understand why the following conditions, agents, stimulants, and excitants produce purulent discharges in men: 1, protracted and repeated coitus, with perhaps much alcoholic excess, masturbation, and priapism with much excitement; 2, spicy food, alcoholics, beer and ale, cantharides, arsenic, the terebinthates, asparagus, iodide and bromide of potassium (these act as irritants through the urine); 3, strong injections, chiefly ammonia, nitrate of silver, permanganate of potassium, bichloride of mercury, etc.; 4, careless passage of sounds and catheters, horseback riding, bicycling, football, and all violent exercises, prolonged walking, and games.

Many authors, notably Guyon ("Sur les Uréthrites blennorrhagiques," *Annales des Maladies des Organ. Gén.-urin.*, vol. i., 1883, pp. 333 et seq.), lay great stress upon certain diatheses as being the (at least) underlying causes of gonorrhœa. These are gout, the plethoric condition, rheumatism, and tuberculosis. This, of course, is debatable ground. There are certainly some persons more prone to infections of various kinds than others: the tissues of these persons, we may say, offer fertile culture-grounds to micro-organisms. Therefore it is, I think, more correct to consider that the diatheses or morbid conditions are underlying and predisposing rather than exciting causes of gonorrhœal infection or of urethral suppuration. There can be no reasonable doubt that in early syphilis the urethræ of men, and sometimes of women, are prone to become the seat of a suppurative

In a like strain wrote my deceased colleague, Dr. Bumstead, who was ever an intelligent, painstaking, and alert observer. He says: "Of one thing I am *absolutely certain*: that gonorrhœa in the male may proceed from intercourse with a woman with whom coitus has for months, or even years, been practised with safety, and this, too, without any change in the condition of her genital organs perceptible to the most minute examination with the speculum. I am continually meeting cases in which one or more men have cohabited with impunity with a woman before and after the time when she has occasioned gonorrhœa in another person, or, less frequently, in which the same man, after visiting a woman for a long period with safety, is attacked with gonorrhœa without any disease appearing in her, and after recovery resumes his intercourse with her and experiences no further trouble. The frequency of such cases leaves no doubt in my mind that gonorrhœa is often due to accidental causes, and not to direct contagion."

These opinions,<sup>1</sup> emanating from three of the most learned and experienced men in the study of venereal diseases, are certainly worthy of attention, and I think that their correctness in the main will be found to be in consonance with the prevailing knowledge of gonorrhœal infection. There can be no doubt whatever that in many cases men, even those previously virgin to the disease, contract true gonorrhœa, presenting typical gonococci, from women who never had gonorrhœa and in whom the most careful and rigorous examination failed to reveal the gonococcus. I have had this experience many times, and I am fully alive to all sources of error and to all the tricks and deceitful practices of patients. Here are three instances: A gentleman virgin to gonorrhœa has had coitus with a girl aged eighteen for a year. He was the only man she had ever cohabited with, and she had never suffered from gonorrhœa or leucorrhœa. Four days after a prolonged and exciting coitus, stimulated by much wine, he developed severe gonorrhœa with abundant typical gonococci. I examined the woman the day after the development of his trouble and the fifth after the coitus. By the speculum I saw that the vulva and

process. The reason is very simple: the tissues of syphilitics (the infection being active) are very prone to be attacked by pyogenic micro-organisms if any traumatism or irritation is inflicted upon them. Horteloup lays great stress (*Leçons sur l'Uréthrite chronique*, 1892) upon herpeticism as an underlying cause of chronic gonorrhœa. He defines herpeticism as a vasomotor and trophic neurosis, but it is hard to understand what morbid entity he means.

<sup>1</sup> In this connection it is well to consider the results of De Luca's experiments ("Contribuzione alla Patologia ed alla Clinica del Catarrho venereo nella Donna," *Giornale Internat. delle Scienze Med.*, nuova serie, Naples, 1880): 1. He injected the purulent uterine secretion of a patient into her urethra, and produced typical gonorrhœa. 2. Later on, when less purulent, the same secretion was injected into the urethra of a prostitute, with no result. 3. Sero-epithelial secretion of uterine catarrh injected into the urethra of a prostitute; no result. 4. The previous case of mild uterine catarrh was rendered purulent by introducing a sound dipped in ammonia into the cervix; the resulting purulent secretion, when injected into the urethra of a prostitute, produced typical gonorrhœa. 5. Purulent sputum, with vibratile epithelium, from a case of bronchitis and malaria was introduced into the urethra of a woman, and produced an active purulent inflammation. 6. Secretion from this artificial urethritis introduced into the urethra of another woman produced typical gonorrhœa. 7. Laudable pus from a small abscess of the eyebrow in a syphilitic subject when introduced into the female urethra produced a subacute urethritis. 8. Secretion from previous subjects introduced into the urethra of another woman produced a similar result. It is unfortunate that the bacteriology of these cases was not studied. It is, however, most probable that these urethral suppurations were caused by pyogenic microbes.



vagina were a little redder than usual, but free from pus (no injections or preparatory cleansing having been used), and that a little glairy whitish mucus escaped from the os. I examined many specimens of the secretions of all the genital parts, taken on a sterilized platinum-wire loop, and found many cocci and bacilli, but absolutely no gonococci.<sup>1</sup> Nothing in the way of treatment was done for this girl, yet she is healthy to-day, having resumed coitus with her lover on his recovery from his ten-weeks' tribulation. I have in six other similar cases made similar examinations and arrived at the same results.

Here is another case worthy of thought, for I can vouch for the correctness of the statements concerning it: A man, whom I cured of gonorrhœa twenty-five years before, came to me, having been perfectly well in the mean time, with a second typical attack, a year or so ago, in the discharge of which gonococci were abundant. He had had coitus only with his wife for many years, and she was confined to her bed as a result of self-produced miscarriage. Her symptoms were those of pelvic peritonitis. Microscopic examination of the secretions showed no gonococci whatever. In the vaginal secretion I found numerous varieties of microbes; in the urethra nothing could be found, but in the pus which exuded from the os uteri both streptococci and staphylococci were abundant. It certainly cannot be claimed that gonococci remained latent in this man's urethra for twenty-five years, and it is clear that his infection was derived from his wife. She had many cocci in the vagina and os, but no gonococci, which her husband had. A similar instructive case is as follows: A gentleman had typical gonorrhœa in all particulars (his first attack, which was followed by severe posterior urethritis). Gonococci were frequently found in his discharge. He had had intercourse with a lady who never had had any affection of the genital apparatus, but who had suffered from a retro-uterine phlegmon for some time, during which he had coitus with her. In her vaginal pus many microbes were present, but no gonococci.

These and several other cases were carefully watched and studied, and in none of the women could gonococci be found, while all the men presented typical gonorrhœa with gonococci-containing pus. Cases like these make one at least skeptical at Finger's statement, "that direct transmission of the gonococci-containing vehicle is necessary to infection." I claim that in the present state of our knowledge such magisterial statements as this (which is the tenet of the gonococcus school) are not warranted. There has not been sufficient study of the healthy and morbid vaginal secretions to warrant such a sweeping and specific statement. Since in these cases of healthy and diseased female genital apparatus it is possible for men to contract gonorrhœa, the questions arise, Was the infecting agent a parasite of the normal urethra which became metamorphosed into the gonococcus? or, Was the agent derived from the female genitals? We know really so little, if anything, of the biology of the gonococcus before it is found in the pus of the male, and from that experimented with, that I think we should be slow in making absolute statements concerning it. That it is frequently found in the female genitals, where it is often a source of infection to man, no one can doubt. But, on the other

<sup>1</sup> Now that the culture of the gonococcus is more readily accomplished, and may be more generally practised, this test as to the nature of the secretions in suspected subjects may be used in addition to the microscope.

hand, in a vast number of women giving gonorrhœa it cannot be found. My studies very clearly convince me that we shall never arrive at absolutely precise knowledge of the etiology of gonorrhœa until all the microbes of the female genitals have been studied with the microscope, by means of cultures, and by experimental inoculation. Further than this, we must have similar knowledge of the microbes of the normal and diseased male urethra. I am absolutely of the opinion that our present limited knowledge of the bacteriology of the male and female genitals does not warrant our throwing aside as obsolete and untrue the results of accurate and painstaking clinical observation of such men as Ricord, Fournier, Bumstead, and many others. The Neisser school claim, first, that faulty observation led these observers to fail to see gonorrhœa, and to consider the process a catarrhal one, because the symptoms were not those of florid gonorrhœa; second, that they are worthless, because they were made before the gonococcus era; and third, that through error, lack of thoroughness of examination, and perhaps by reason of the deceit and misrepresentations of the women, localized spots, patches, or follicles of gonorrhœal inflammation in the urethra, in urethral and juxta-urethral follicles, in vulvar follicles, Bartholin's glands, and in the os uteri escaped observation, and were the seats from which infection was derived. In the cases above reported and in others I kept in mind the pitfalls of error and false judgment; I was prepared for deceit and falsehood, yet I failed to find gonococci in the secretion of women from whom men virgin to gonorrhœa contracted typical blooming infections. That the gonococcus is found in acute gonorrhœa of the male, and is seemingly the morbid agent, I have already cheerfully conceded. But where, in very many cases, does it come from? Is it a metamorphosed and virulent microbe which has originated in a harmless denizen of the normal or diseased urethra? or is it a torpid inhabitant of the vagina, unrecognizable in that stage as the gonococcus, but which under sexual excitement and alcoholic stimulation becomes a formidable agent with intensely virulent properties? I have in my reading seen it stated that man is the natural incubator of gonorrhœa. Is it possible that the male urethral mucous membrane is the tissue most suitable to the nurture, fructification, and maturity of this peculiarly virulent microbe?

Many authors speak of a virulent form of gonorrhœa—and I have seen many such instances—which is sometimes contracted by men from women in coitus during or just after the menstrual process. These menstrual gonorrhœas in most cases present the typical clinical picture of florid gonorrhœa, and they may pursue the same course and be attended by the same complications. Many of these women never had gonorrhœa; some are absolutely free from all genital abnormalities; others may have some abnormal but simple, non-specific condition, yet at the menstrual epoch they become poisonous. Can it be that the hyperæmia and bloody fluid for a time vitalize the usually inoffensive microbes which are present in all vaginæ, and endow them with virulent principles. We cannot to-day answer this question, but we can say that during menstruation some perfectly pure and healthy women at times give men typical gonorrhœa.

It is further claimed that the secretions from the cavity of the uterus, from the swollen and exulcerated cervix, from laceration of the cervix and perineum, those due to uncleanness of the vulva and vagina, and

arising from chronic simple inflammation of these parts, may give rise to gonorrhœa. In such cases the Neisser school will claim that there are gonococci in the pus or that the resulting infections in the men are simple urethritis. Yet let any one study these cases without bias or prejudice, and he will find that many times the gonococcus is absent from the female discharge, while the male has typical gonococci-urethritis.<sup>1</sup>

The trend of all this is that this subject of the etiology of gonorrhœa is yet in an unsettled state, and that opinions should be formed in all cases with care and reserve. It is possible for a man to have a urethral discharge containing true gonococci which he contracted from a woman who never had gonorrhœa. According to doctrines now largely prevailing, the gonococcus in the male is presumptive evidence of guilt of the woman. Such a doctrine is too absolute, and even cruel, and may be the cause of much unhappiness, suffering, and misery. This question often involves the virtue of wives and the loyalty of mistresses, and demands our earnest attention. Dr. Bumstead, in a passage which shows very conspicuously the kindly nature of the man and the broad conservatism of the physician, says on this subject: "The importance of this truth whenever a physician in the exercise of his profession incurs the great responsibility of passing judgment upon the virtue of a woman, and thus affecting her reputation and happiness (and often that of many others with whom she is connected) for life, cannot be overrated. In all such cases the accused should receive the benefit of any doubt which may exist, and the physician who withholds it from her out of a morbid fear that he may be imposed upon, and thus runs the risk of convicting an innocent person, is unworthy of his calling. His province is to decide from the symptoms, taken in connection with the known facts of the case, and unless these are sufficient to establish guilt beyond the shadow of a doubt humanity demands at least a verdict of 'not proven.'"<sup>2</sup>

<sup>1</sup> This statement is strikingly supported by a very important case which is just now under my care: A young man who had never had gonorrhœa had connection with his mistress, a strong and healthy girl, who likewise never had gonorrhœa, under the conditions of prolonged excitement and liberal alcoholics. In three days he experienced the typical signs of incipient gonorrhœa, which developed in a florid manner, the secretion showing numerous gonococci. I carefully and thoroughly examined the woman, and found no inflammation about her genitals and no gonococci whatever. Violating all the directions given him, the man in the fourth week of his gonorrhœa ventured to have coitus with this woman, he then noticing only a slight amount of discharge in the morning. By this act he was rendered much worse. Four days after this coitus the young woman, who had been perfectly well in the interval, complained of pain on urination, and three days after this I found her with a profuse purulent discharge from the urethra and acute vulvitis. Gonococci in abundance were found in the urethral and vulvar pus. In this case the man certainly was the incubator of the gonorrhœa, which he gave to his consort.

<sup>2</sup> The justice and force of the foregoing remarks are well brought out by the following cases: A married man, twenty-six years old, returned after a month's absence and cohabited with his wife. In two days he noticed the usual symptoms of acute gonorrhœa, and consulted a physician, who informed him that he was suffering from that disease. To the patient's remark that he had only had connection with his own wife, the physician replied that gonorrhœa came from gonorrhœa—ergo, the wife had that disorder. The patient being incredulous, the physician fortified his position by quoting from the work of a prominent author from whose teachings he had gained his belief. Such was the patient's anger that he immediately confronted his wife, who was at the full table of a large boarding-house, and in vile and blasphemous language accused her of infidelity and of giving him a foul disease. Amid shame and distress of mind the wife indignantly spurned the charge, but to no effect. The husband left the house and went elsewhere, but took occasion to inform his wife's relatives of the state of affairs. At this time a second visit to the physician resulted in a more positive asseveration of his opinion. Such was the



## CHAPTER VIII.

## THE PERIOD OF INCUBATION AND THE PREDISPOSING CONDITIONS AND CAUSES OF ACUTE ANTERIOR URETHRITIS OR GONORRHOEA.

THOUGH the fact was denied in years gone by by Ricord and others, gonorrhœa certainly has a period of incubation. In this it resembles the many and varied infectious processes. Mechanical and chemical irritation or damage result promptly in inflammation of the urethral mucous membrane, and little time elapses between the receipt of the injury and the appearance of the discharge. In urethritis, however, more or less time elapses between the infecting coitus and the onset of the inflammatory symptoms. This lapse of time is called the period of incubation, or, as I suggested before, the period of microbic colonization. In this time the micro-organisms seated on the mucous membrane are increasing in number, spreading, and gaining a firmer foothold before involving the deeper parts.

The length of the period of incubation varies in different cases, being sometimes quite short and again rather prolonged. In intelligent, watchful patients it is commonly easy to determine with considerable definiteness the exact length of this period. Then, again, in careless and obtuse patients unsatisfactory data only are to be obtained. Patients very frequently, for various motives, make false statements as to the length of this period.

In the following table are contained the records of 505 cases very carefully observed at my clinic (Vanderbilt Venereal and Genito-urinary Clinic). These cases are instances of first attacks or infections. They were seen in the acute stage, when the symptoms were severe and typical and the discharge profuse and purulent. Time was wanting in which to search for the gonococcus in these cases :

desperate state of affairs that the husband consulted a lawyer with a view of getting a divorce. At this juncture the wife's brother insisted that her husband should accompany her to my office, with the view of settling the matter. It was a memorable interview with the sullen and angry husband and the indignant and outraged wife. The husband's first question was, Could a man contract gonorrhœa from a wife who was not thus affected? To which I replied, emphatically, Yes. I then went over with him the various sources of origin of gonorrhœa, and instanced cases which I had met in which groundless suspicions had been entertained between husband and wife. When I came to inquire into the circumstances of his case, I learned that his wife had some time previously been the subject of an operation upon the uterus, and that she suffered from leucorrhœa. This was sufficient to clear her of all suspicion ; but when I mentioned the fact that menstrual fluid sometimes caused severe gonorrhœa, the wife eagerly and triumphantly said to him that he had forced her on that night to have intercourse in spite of her waning menstruation. The husband was chagrined and humiliated. Later on, domestic happiness was restored.

A still sadder case was published in an old French work on venereal diseases : A young man, after having lived with a young girl for some years, married her. Some months after he was compelled to take a journey of some distance, and while travelling was attacked with gonorrhœa. He consulted a physician, and informed him that he had never had connection with any woman but his wife. The physician laughed and made a sarcastic reply. Some days after, when the testicle swelled, the latter informed him that if his wife was virtuous he must have had "une affaire" with other women. The young man wrote to his wife an indignant and passionate letter and blew out his brains. The unfortunate woman, who was found to be free from disease, miscarried and died.

Days.	Cases.	Days.	Cases.
1 . . . . .	1	9 . . . . .	47
2 . . . . .	17	10 . . . . .	27
3 . . . . .	67	11 . . . . .	6
4 . . . . .	79	12 . . . . .	3
5 . . . . .	66	13 . . . . .	2
6 . . . . .	36	14 . . . . .	14
7 . . . . .	105		505
8 . . . . .	35		

It will be seen that in this table the greatest number of cases had an incubation of seven days, but that a goodly number of cases are recorded as occurring on the second, third, fourth, fifth, and sixth days. It will be further noted that from the eighth to the tenth day, inclusive, the number of cases is 107, being rather more than are contained in the figures for the first seven days.<sup>1</sup>

These statistics therefore show that the early symptoms in the great majority of cases of gonorrhœa occur within ten days after the infecting coitus. From the tenth day on to the fourteenth the cases are small in number, and from that time up to the twentieth day are still smaller. In this connection the recent statistics of Lanz<sup>2</sup> are interesting, since in each instance the presence of the gonococcus was said to have been demonstrated. Lanz's figures are—

Days.	Cases.	Days.	Cases.
1 . . . . .	2	8 . . . . .	1
3 . . . . .	15	10 . . . . .	1
4 . . . . .	4	14 . . . . .	1
5 . . . . .	9	20 . . . . .	2
7 . . . . .	4		39

Thus it appears that out of 39 cases the incubation-period was within seven days in 34, the majority occurring on the third and fifth days.

Comparing now my own statistics, those of Lanz, together with those

<sup>1</sup> Finger has also collated from the statistics of Eisenmann, Hacker, and Hölder the following table of the duration of incubation in acute anterior urethritis:

1 day in 11 cases;	11 days in 6 cases;
2 days " 59 "	12 " " 8 "
3 " " 126 "	13 " " 6 "
4 " " 62 "	14 " " 19 "
5 " " 49 "	19 " " 2 "
6 " " 10 "	20 " " 1 case;
7 " " 63 "	30 " " 1 "
8 " " 12 "	Uncertain " 9 cases;
10 " " 23 "	479 cases.

It thus appears that in 380 out of 479 cases, or more than two-thirds, the period of incubation was within the first week. In my own statistics the incubation-period was within the first week in 361 cases, which is a little under three-quarters of the whole number.

The statistics of Le Fort (*Gazette hebdomadaire de Méd. et de Chir.*, 1869, Nos. 23 and 24) are also of interest in this connection. This observer studied the incubation-period by exact record in 2070 cases of gonorrhœa, many of whom, however, had one or more previous attacks. In 778 of these cases the disease appeared within four days, being 37.5 per cent.; in 869 it began between the fifth and eighth days, being 41 per cent.; in 276, between the ninth and twelfth days, or 13 per cent.; in 112, from the thirteenth to the sixteenth day, or 5 per cent.; and in 17 patients only between the seventeenth and twentieth days. According to these statistics, gonorrhœa most commonly appeared between the fourth and eighth days, there being 1647 cases, or 79.5 per cent. In only 35 out of the total 2070 cases did the incubation-period extend beyond fifteen days.

<sup>2</sup> "Ein Beitrag zur Frage Incubationsdauer beim Tripper," *Archiv für Derm. und Syph.*, 1893, pp. 481 et seq.

of Finger and Le Fort, we find that the vast majority of cases of gonorrhœa begins within seven days of the infecting coitus.

In the cases of gonococci-inoculation,<sup>1</sup> as we have seen in the experiments of Welanders, Bumm, Aufuso, and Wertheim, the period was two or three days.

Much doubt should be placed on the statement that the incubation-period was only one day. In such cases preputial irritation is undoubtedly mistaken for the true gonorrhœal symptoms, or the cases are those of second, third, fourth, or fifth infections, in which inflammatory symptoms show themselves very promptly. As a general rule, it will be found that the period of incubation is two or three days, but sometimes five, six, or seven days.<sup>2</sup> Considerable incredulity is warranted in cases in which the history of the incubation is beyond ten days, and the statement that it is twelve to twenty days or longer needs strong substantiation. I have no doubt that errors have crept in in the histories of many of the cases of prolonged incubation included in the table of very old cases collected by Finger. To sum the matter up, we may say that the symptoms of gonorrhœa may appear as early as forty-eight hours after infection; that they commonly appear about three to five days after it; and that periods

<sup>1</sup> Experimental inoculations with pus have thrown much light on the incubation-period of gonorrhœa. These experiments have been made with gonorrhœal pus and with pus from virulent ophthalmia.

Thiry (*Récherches nouvelles sur la Nature des Affections blennorrhagiques*, Bruxelles, 1864, pp. 32 et seq.) took gonorrhœal pus from the urethra and placed it in the conjunctival sac. In twenty-four hours an acute purulent inflammation was produced. Pus from the infected eye was placed in the urethra of a man who had never had gonorrhœa. In forty-eight hours a true gonorrhœa was produced.

Pauli de Landau (*De la Nature de l'Ophthalmie d'Egypte*, Wurzburg, 1858) placed the pus of ophthalmia neonatorum in the urethra of a healthy man, who in three days suffered from acute gonorrhœa. He similarly infected a woman, in whom also the incubation-period was three days.

Guyomar ("Les Ophthalmies et les Uréthrites contagieuses," *Thèse de Paris*, 1858) introduced a sound smeared with pus of purulent ophthalmia into the male urethra, with the result of producing gonorrhœa in two days.

Welanders, as elsewhere stated, produced gonorrhœa in two days by the inoculation of gonorrhœal pus.

<sup>2</sup> This estimate is further in accord with the views of most of the recent writers. Lesser (*Lehrbuch der Haut- und Geschlechtskrankheiten*, 11 Theil, 1888, p. 8) says that the average is two or three days—that the incubation is seldom shorter or longer. Six to seven days would be the outside limit.

Güterboch (*Die Chirurg. Krankheiten der Harn- und Männlichen Geschlechtsorgane*, 1890, Band i, p. 45) says that seven days is the longest incubation-period, while Fürbringer (*Die Krankheiten der Harn- und Geschlechtsorgane*, 1884, p. 273) thinks that the average is four days.

Neumann (*Lehrbuch der Venerischen Krankheiten und der Syphilis*, 1888, p. 75) says that the incubation-period is variable. His average is from two to five days.

Podres (*Die Chirurg. Erkrankungen der Harn- und Geschlechtsorgane*, Theil i, 1887, p. 84) thinks that the incubation-period of the first gonorrhœa is twenty-four to forty-eight hours, and in later infections it is longer, lasting from sixty to eighty hours.

Kopp (*Lehrbuch der Vener. Erkrankungen*, 1889, p. 14) calculates the average to be three to four days, recognizing rare cases in which it is ten to twelve days, and others in which it is six or seven days.

Letzel (*Lehrbuch der Geschlechtskrankheiten*, 1892, p. 17) places the period at two to four days, sometimes earlier and sometimes later.

Julien (*Traité pratique des Maladies vénériennes*, 1886, p. 29) thinks that the average is from three to five days, but that in first infections it may be four, five, even six days.

Finger, on the other hand (*Die Blennorrhœe der Sexualorgane und ihre Complicationen*, 1891, p. 43), maintains that the incubation of a first gonorrhœa is shortest, that the average is three to five days, and that in later infections it is seldom more than six or seven days.



of infection of seven to ten, and even fourteen, days' duration may occur, but not very frequently.<sup>1</sup> I have known such periods of incubation, and even longer ones up to twenty days, to be observed in patients suffering from pneumonia, typhoid fever, and erysipelas. On the other hand, the period of incubation is sometimes made shorter by prolonged sexual intercourse and alcoholic excesses. Then, again, the intensity of the infecting pus containing abnormally large quantities of the gonococcus may have an influence upon the suddenness of the attack. It is also safe to assume that the tissues of some individuals are more prone to the attacks of micro-organisms than those of others. Under these circumstances an incubation of twenty-four to thirty hours is possible.

The fact of there being a variable period of incubation in gonorrhœa suggests the advisability of a patient refraining from coitus, hymeneal or social, for a goodly number of days after intercourse with a doubtful or suspicious woman.

In striking contrast with this virulent infective process, with its well-marked period of incubation, are those forms of purulent urethritis due to the passage of sounds and bougies or caused by strong injections, in all of which the discharge comes on in a few hours.

**Predisposing Conditions and Causes.**—The size and conditions of the penis are frequently factors in the contracting of gonorrhœa. Thus a very long organ is frequently infected by pus from the uterine neck or fornix vaginae, while a shorter one may escape. A very large and thick organ may give rise to friction and irritation, and in that way become infected. Patients with naturally large meatuses, and particularly those in whom unnecessarily large meatotomy has been practised, are also very susceptible. A meatus which opens on the under surface of the glans, resembling hypospadias, and the condition of hypospadias itself, predispose the bearer to gonorrhœal infection. Then, again, cases are seen in which this form of the opening exists, and with it shortness and tightness of the frænum, and perhaps of the prepuce. In such cases there is much redness of the fossa navicularis and a marked tendency to acquire gonorrhœa. In these cases, and in those of hypospadias where the meatus is thus placed low in the glans, it is probable that the secretions of the vagina, which gravitate to its posterior wall, are sucked in by capillary attraction, and find easy entry into the fossa navicularis and there produce infection.

Phimosis, natural or acquired, tends to render its bearer liable to gonorrhœa by reason of the hyperæmia which it induces in the lips of the meatus and the urethral tissues immediately beyond. In the same

<sup>1</sup> Several cases of very long incubation have been recently reported. Ehlers (*Annales de Dermatologie et de la Syphiligraphie*, 1892, p. 556) reports the case of a physician who had not previously suffered from gonorrhœa, who had connection Nov. 30, 1891, and on Dec. 22 felt a sensation of heat at the meatus, which was followed Dec. 28 by a purulent discharge containing gonococci. In this case the incubation-period was twenty-two days.

Lemonnier (*ibid.*, 1892, pp. 732 et seq.) reports an unsatisfactory case in which he thinks that there was an incubation of twenty-eight days.

Lanz (*op. cit.*) reports a case in which the patient claimed that ten weeks had elapsed between the coitus and the evidences of infection. The same author also reports a case in which the incubation is stated as of five weeks' duration. In this case the patient had suffered from gonorrhœa three and a half years previously, and satisfactory evidence is not offered to clear away the doubt, which is warranted, that the case was one of the lighting up of an old smouldering inflammation.

manner balanitis and balano-posthitis, either resulting from phimosis or, as frequently occurs, from inattention and uncleanness, produce a hyperæmic condition of the distal urethral mucous membrane which renders it favorable to the growth and multiplication of the gonococci or other pus-producing microbes.

Warts at or near the meatus are frequent causes of urethral suppuration. Scars, contractions, and hyperæmia at the meatus, left by antecedent syphilitic infiltrations, primary or late, and chancroids, not uncommonly tend to render their bearers susceptible to gonorrhœa. Long-continued copulation, particularly in persons under the influence of alcoholics, is a potent factor of infection. In such cases ejaculation is long delayed, the penis and vagina are much irritated, and gonorrhœa very frequently follows. Indeed, venereal excesses are common and prolific causes of gonorrhœa. Persons who have recently recovered from an attack of gonorrhœa are especially predisposed to subsequent infections. Then, again, lesions of the urethral walls from the meatus to the bulb, which generally consist of submucous thickening, with granular, papillomatous, or exulcerated hyperæmic patches, are a constant menace to their bearers, who contract gonorrhœa at seemingly slight provocation. I have many times seen men who in an early gonorrhœa had suffered from inflammation of one or more of the glands or lacunæ of the urethra, which, not going on to abscess-formation, had resolved and left an inflammatory focus, who thereafter were prone to gonorrhœal infection even when guilty of no excesses.

Masturbation may produce such a hyperæmic condition of the meatus and fossa navicularis that infection may readily occur.

There can be no question that in some cases of early syphilis the distal parts of the urethra are rendered more prone to the invasion of gonococci and other microbes. This tendency may be brought into action by abnormal conditions of these parts, and may exist in cases where no abnormality is present. An active syphilitic diathesis can undoubtedly be at the root of the persistence of a gonorrhœa, and may also be a factor in the induction of relapses. It must be borne in mind that the disease then is not syphilitic in nature. It is an infective urethritis, due to micro-organisms, occurring in a syphilitic in whom the diathesis is still active and whose tissues are more vulnerable to irritation and microbic invasion than those of a previously healthy person.

Though it is contended that patients suffering from gout, rheumatism, anæmia, the so-called scrofula, and tuberculosis are more liable than others to gonorrhœa, as yet no truly scientific evidence has been offered in proof thereof.

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## CHAPTER IX.

## ACUTE ANTERIOR GONORRHŒA, OR URETHRITIS.

By the term "acute anterior gonorrhœa or urethritis" is meant an infective process attended by abundant suppuration, caused by micro-organisms which may involve the urethra from the meatus to its bulbous portion, and which may stop at the triangular ligament. In the majority of cases the infective process spreads from the meatus, like other infectious diseases—for instance, erysipelas—to parts beyond, traversing the pendulous urethra, reaching the bulbous portion, and there, under favorable circumstances, stopping, in the minority of cases. By some it is claimed that acute gonorrhœa is generally limited to the region of the fossa navicularis, to the pendulous urethra, and that it may reach the region of the bulb. This may occur in second and later infections and in cases of persistent relapses, but long observation has convinced me (and my conclusions are in accord with those of many recent writers) that in acute primary gonorrhœa the suppurative process quite promptly extends back to the bulbous urethra and even beyond. I have many times verified this statement by the very careful use of the endoscope and by examination of the urine. Acute anterior gonorrhœa in primary or secondary attacks means suppuration of the canal from the meatus to the triangular ligament.

Exceptionally we see cases—but they are usually instances of second and even later infections or of repeated relapses—in which the disease is seemingly limited to the region of the fossa navicularis; other cases in which more or less of the pendulous urethra is involved; while in others still the morbid process rapidly runs back to the region of the bulb and there becomes most intense. Thus we come to speak (*a*) of gonorrhœa of the fossa navicularis; (*b*) of the pendulous urethra; and (*c*) of the bulb. In the majority of cases of primary infection, however, as before stated, the whole anterior urethra is involved, and in the decline of the acute stage the morbid process, as a general rule, settles in a more or less subacute condition in one or more of the parts just named—namely, the fossa navicularis, the pendulous urethra, and the bulbous urethra. In between 80 and 90 per cent. of these cases in which the whole anterior urethra is attacked the infection spreads to the posterior urethra.

Since the **symptoms** of anterior gonorrhœa or urethritis are well marked, it is best for clearness of description to fully describe them; then the clinical facts concerning the infection of the posterior urethra can be more lucidly presented.

## THE PRODROMAL STAGE.

At the end of the period of incubation the symptoms of gonorrhœa manifest themselves. These may be quite severe, they may be mild, or, again, they may be entirely absent. Patients usually complain of a tickling, pricking, and itchy sensation at the meatus or in the fossa navicu-



laris. Some describe it as a sensation of titillation which is not at all disagreeable. Diday compares the sensation to that produced by a fly alighting on the skin, while Ricord says that the beginning of the disease is marked by an exaltation in the function of the organ and by an exaggeration of its normal sensibility, vitality, and secretion. These sensations may be accompanied by a feeling of more or less heat in the parts. Then, again, in some cases decided uneasiness, bordering on pain, is felt, which may be spontaneous and continuous or only felt during and after urination. The intensity of these early symptoms of acute gonorrhœa very often depends largely on the nature of the patient. A nervous, worrying subject complains more or less strongly, while an ignorant, apathetic, or obtuse one may make no complaint whatever. We not infrequently see patients who positively state that the discharge is the first symptom known to them.

Inspection of the meatus in the prodromal stage shows it to be slightly reddened, glazed, and perhaps coated with a film of colorless, grayish, or opaline mucus, in which a few minute whitish flakes or suet-like lumps are mixed. This fluid is usually quite scanty, but sometimes one or more drops may be expressed from the canal. It grows more copious as time advances. Frequently this secretion produces a gluing together of the lips of the meatus in the intervals of urination, which act may be thereby impeded for a few moments. This symptom of gluing together of the lips of the meatus is frequently the first sign the patient has of his oncoming disease.

Microscopic examination of this secretion shows, as we have already seen, columnar—or, at first, flat—epithelium, with more or less gonococci seated at their margins and over their surface, and, later on, the admixture of pus-cells. In this stage the urine is clear and free from mucus, but on agitation a few minute gray flakes or little lumps may be seen. In other words, a few infected epithelial cells float in healthy urine.

In some cases the infective process of gonorrhœa at the onset is quite slow in development, and very little disturbance may be noted at the meatus for several days. I have seen a goodly number of cases in which three, four, seven, and even ten days elapsed before decided symptoms of inflammation showed themselves, and in which the only noticeable abnormality was a little increase of redness of the meatus and a little exaggeration of the normal quantity of mucus. As a rule, however, after the lapse of one, two, or three days a more decided state of inflammation is seen. The lips of the meatus become swollen and perhaps pouting, and the redness invades the glans penis in a disk-like form around the meatus. The mucous secretion becomes increased in quantity, then assumes a decidedly opalescent hue, from which it is rapidly transformed into a milky-looking fluid, and then into true greenish pus. A decided smarting or burning pain, called *ardor urinæ*, is then felt in the fossa navicularis, particularly during urination and sometimes continuously.

The irritation incident to the prodromal stage being limited to the distal part of the penis—namely, the region of the fossa navicularis, which Zeissl very truly calls “the sensorium commune of the entire territory of the genital organs”—frequently gives rise to a condition of erethism in that organ, which remains in a state of incomplete erection. Desire for coitus is sometimes so urgent and uncontrollable that sexual excesses

are committed and masturbation is practised, much to the aggravation of the disease.

I have many times seen women, wives and mistresses, infected by men in the prodromal stage of gonorrhœa, whose urethræ were as yet free from pus. Zeissl speaks of a similar experience. In these cases the infection is carried by the epithelial cells, which are covered or infiltrated with gonococci.

As a rule, the symptoms of acute anterior gonorrhœa in its prodromal stage are strictly local in character. Finger states that in sensitive individuals slight general symptoms, such as depression, malaise, and anorexia, may occur at this time. Though I have looked into the subject very carefully, I have been unable to convince myself that these symptoms are due to the infective process *per se*. I am led to think that trouble and worry of mind, induced by an impending gonorrhœa, are the factors of the patient's indisposition, rather than a general reaction of the infection.

As a rule, a patient's worry and fret begin in the next stage. With the onset of the classical symptoms of true inflammation—namely, redness, swelling, pain, and pus—the prodromal stage is said to end and the acute or florid stage to begin.

THE ACUTE STAGE.—The redness, previously limited to the halo-like disk around the meatus, may spread and involve the whole glans, which then becomes swollen. Then, particularly in cases in which the prepuce is long and tight, this muco-tegumentary covering becomes red and swollen in part or in its entirety. As a result œdema may be produced, which may be limited to the region of the fossæ of the frænum or it may involve the distal part of the prepuce. In very severe cases it attacks the whole integument of the penis, and thereby causes much pain, tension, and discomfort. Frequently very little œdema is present, but we may find the lymphatics on either side of the frænum swollen, and can trace them as small, red, tender cords along the dorsum of the penis to the lymphatic ganglia in the groin, which may be more or less swollen and painful. Not infrequently phimosis is induced, which much distorts the shape of the penis. Then, again, paraphimosis is a not infrequent, painful, and disquieting complication. The discharge is then profuse, thick, creamy, and decidedly purulent, and sometimes mixed with blood. It dries upon and soils the patient's linen, and may often be seen in the form of crusts near the meatus and on the glans when not covered by the prepuce. This condition of affairs, which is usually reached toward the end of the first or early in the second week, and perhaps earlier, is attended by the extension of the disease down the urethra, perhaps as far as the bulb. Then in severe cases the corpus spongiosum can be felt as a swollen, hard, cord-like tube which is painful to the touch. Occasionally we can detect along the course of the corpus spongiosum one or more little swellings or periurethral nodules of the size of small shot or of a pea, which are simply inflamed follicles. They show, however, that the gonorrhœal process has involved the whole thickness of the mucous membrane, and has attacked the meshes of the corpus spongiosum. In cases presenting this intensity of symptoms the whole thickness of the mucous membrane, the subcutaneous connective tissues, and the erectile tissue of the corpus spongiosum are involved. In these cases the gonorrhœal pro-

cess has extended deeply, but there are cases in which the symptoms are very severe, but in which this depth of invasion of the inflammatory process cannot be made out, since the spongy urethra does not feel very much swollen. There are instances in which the gonorrhœal process is superficial and only invades the mucous membrane and the submucous coat slightly; such cases are not at all uncommon. As a result of this inflammatory swelling of the mucous and submucous tissues the calibre of the urethral canal is very much narrowed. Urination then becomes an act of pain, and even of agony, by reason of the induced scalding and burning sensations, described by some as if a hot iron had been introduced into the canal, which may be felt along the whole of the pendulous urethra, or it may be most severe at the fossa navicularis. Sometimes the pain is said to be at the peno-scrotal angle, and at others as far as the bulb. The patient dreads to void his urine, and ventures to do so as seldom as possible. In the graphic language of my late colleague, Dr. Bumstead, the dysuria of gonorrhœa is thus described: "During the act the patient involuntarily relaxes the abdominal walls, holds his breath, and keeps the diaphragm elevated in order to diminish the pressure on the bladder and lessen the size and force of the stream." As pointed out long ago by Ricord, this burning pain on urination is due to the forcible distention of the inflamed and suppurating urethra, and also to the acid condition of the urine. A further result of this mechanical narrowing of the canal is seen in the character of the stream of urine. This becomes hesitating, weak, sputtering, forked, twisted, narrow, and wiry, and the urine may even escape by drops. All the shapes of the stream of urine produced by stricture may be simulated in the acute stage of gonorrhœa. At this time a patient's suffering during urination may be still more intensified by spasmodic contractions of the compressor urethræ muscle, which not unfrequently causes strangury and retention of urine.

Very often, both in the acute, declining, and chronic stages of gonorrhœa, patients complain of dribbling of urine on their linen for a few minutes after each urination. This condition is due to the loss of the resiliency of the urethral canal, which by its contraction aids in the final expulsion of the last drops. The urethral walls are so swollen and œdematous that their muscular fibres have lost their tonus.

It must not be forgotten that in uncomplicated acute anterior gonorrhœa there is usually not much, if any, increased desire to urinate. Such patients can, as a rule, hold their water nearly as well as they did in health. Sometimes the patient urinates a little more often than he does normally; consequently, he seldom has to get up at night more than once for the purpose of urination. In acute anterior gonorrhœa we never observe tenesmus and uncontrollable desire to urinate, as we do in acute posterior gonorrhœa.

The acme of this acute stage, which is reached usually in the second week, is attended with a still more unpleasant train of symptoms. The urethra is then involved from the meatus to the bulb. The pendulous urethra is sensitive, and even painful, and when the disease is located at the bulb there is a sensation of tightness, and even anguish, between the testes; walking is rendered uncomfortable and sudden jarring causes much pain. When such patients attempt to sit down, they go about it slowly and carefully and avoid pressure upon the perineum. They are



also careful in crossing their legs lest they should suffer thereby. Besides these pains in the penis and perineum, there may be a more or less uneasy aching and dragging pain in the testes, which, however, may not be affected, and also in the groins and lumbar region. As a consequence of all this suffering many patients become really ill, and they look pale, worried, and hollow-eyed, lose their appetites, feel weak, and, in short, suffer from malaise and mental depression. Some patients have a mild or pronounced fever,<sup>1</sup> accompanied by chilliness, especially toward night. While such patients suffer much during the day, they frequently endure much discomfort, and even torture, during the night. Insomnia is not infrequently experienced as the result of painful erections, accompanied by debilitating pollutions, and also by chordee or chorda venerea, by which the penis is bent in the shape of a bow and much pain, and even agcny, is produced. Chordee is due to œdematous infiltration of the corpus spongiosum, which becomes less extensible than the corpus cavernosum. As a result, when in erection the cavernous bodies undergo extension and lengthening they are drawn down or to one side by the thickened and unyielding spongy body, which acts like the string of a bow.<sup>2</sup> Though chordee is so much spoken of as an accompaniment of acute gonorrhœa, it is really not a very frequent symptom. My observation teaches me that in most cases it is the result of the too early use of strong injections and balsamics or of alcoholics, which greatly intensify the severity of the disease.

Erections and chordee, induced by the warmth of the bed, torment and debilitate a patient by reason of their persistence. Having relieved himself of one attack, he goes back to bed and falls asleep, only to be seized sooner or later by another spasm. As a result, the patient feels weak and dejected in the morning, and is often unfitted for the proper performance of his daily duties.

<sup>1</sup> Trikaki, in Mauriac's service at the Ricord Hospital ("De la Fièvre dans la Blennorrhagie aigue," *Annales des Mal. des Organes Gén.-urin.*, 1895, pp. 154 et seq.), examined by means of the thermometer in the rectum, methodically and with great care, 50 cases of acute gonorrhœa without complications, and in which was no intercurrent disease. Of these 50 cases, fever was found in 31, and not in 19. In these 19 cases, however, there were 6 in which the acute stage had passed away. Trikaki concludes that in cases of acute gonorrhœa the rectal temperature is above the normal, reaching to 103° and even 105° Fahr. It is a true fever, and is observed in about two-thirds of all cases. It is found in the acute stage, and is intense in proportion to the severity of the gonorrhœa, and declines with the amelioration of the urethral suppuration.

These statements of Trikaki, being in contradiction to the views of Guyon, who maintains that there is usually no fever during the course of gonorrhœa, Noguès ("De la Temperature dans la Blennorrhagie aigue," *ibid.*, 1895, pp. 433 et seq.), a pupil of that eminent French surgeon, carefully examined thirteen cases of acute gonorrhœa, and found an ephemeral fever in only one case, in which there was acute prostatitis of short duration.

<sup>2</sup> Hilton thinks that in erection there is a sudden spasm of the vaso-motor muscles of the penis, caused by irritation of the branches of the pudic nerve which go to the urethra, and that erections are caused by excito-motor action upon the spinal cord, which during sleep is not under control of the brain. The mechanism of chordee can be well illustrated by fixing a narrow piece of adhesive plaster along the surface of an India-rubber condom, and then distending it with the breath. Patients should always be warned that in case of chordee no violence should be done the organ by forcibly straightening it or "breaking the cord," since severe hemorrhage, and even septic infection, may occur, and a lesion of continuity may be made which will almost inevitably terminate in stricture. Cases are on record in which phlebitis and gangrene followed injury to the penis during chordee, and resulted in death.

During all this time the discharge is purulent and greenish, and often mixed or streaked with blood, when it may present a dusky hue.

In this acute stage we often see a peculiar form of hæmaturia. Toward the end of urination or a short time thereafter a few drops of blood may escape from the urethra. Sometimes this does not occur until after the patient has replaced his penis under his clothes, which he subsequently finds stained. This post-mictional hæmaturia is due to compression of the inflamed mucous membrane by the accelerator urinæ muscle and to its forced distention by the stream of urine.

In most patients the purulent discharge is more profuse in the morning, from which time it diminishes in quantity till night, when it reaches its minimum. This condition is largely due to the less frequency in urination during the night, when, of course, the secretion accumulates in the canal. It is also due in many cases to nocturnal exacerbation of the disease, resulting undoubtedly largely from exercise taken and exertion made on the day previous. There can be no doubt that in a large proportion of cases of acute anterior gonorrhœa there are nocturnal exacerbations and diurnal remissions. In other cases we see a continual profuse flow of pus from the meatus, and we hear patients express wonder as to where so much discharge comes from. Coming, as it does, from the pendulous and bulbous portions of the urethra, it is easy to see, considering the extent of the surface, why it is so profuse. When patients remain in bed, then the exacerbation and remission of symptoms are usually very much less marked.

This ensemble of morbid phenomena, inflammatory and subjective, is generally complete toward the end of the second or early in the third week, and its further duration depends largely upon the hygiene, regimen, diet, and treatment of the patient. If rest and quiet can be obtained and proper medication is followed, the patient's condition will begin to mend at this time. The first noticeable feature of improvement is a diminution in the patient's sufferings, particularly during urination. Then he will be progressively less troubled with his painful nocturnal symptoms, and, as a result, he will sleep better and will feel stronger and more cheerful. His appetite will become better and his general morale improved.

In some cases, however, pain, soreness, or a burning sensation on urination persists after all other symptoms have become ameliorated or have even disappeared.

The symptomatic pains and uneasiness in the testes, loins, and groins will become markedly less, when inspection and examination of the morbid parts will show that the inflammatory process is on the decline. The redness (and swelling, if present) about the glans and prepuce will subside, the meatus will appear more normal in color and in shape, and the corpus spongiosum will be much less tense, swollen, and painful. Then, owing to the as yet partial subsidence of the swelling of the urethral mucous membrane, the stream of urine will become stronger and larger. The discharge is at this time usually copious, but it insensibly grows less green and becomes more milky and mucoid. Its quantity then decreases, and it gradually grows thinner in consistence. Thus it slowly disappears under favorable circumstances until only a little grayish muco-pus may be seen during the day, or it may be only visible

in the morning, when it glues the lips of the meatus together. This condition may remain for a few or several days, and then, if treatment is followed, no discharge can be seen and the urethra seems again in a normal condition.

The foregoing description applies only to cases of anterior gonorrhœa, in which the morbid process, as already stated, stops at the triangular ligament. In many such cases, unfortunately, toward the end of the first and in the second week the suppurative process extends to the posterior urethra, and a new order of phenomena, to be described later on, is ushered in. In this event the suppurative process in the anterior urethra may cease entirely or it may smoulder in a subacute form.

It must be clearly borne in mind that the foregoing symptom-complex is that presented by a severe form of acute anterior gonorrhœa, and that there are milder forms in which the gonorrhœal process is less intense and the symptoms less severe. Thus the pain or burning on urination may only amount to a mild sensation of heat or a slight pricking or smarting. Erections may be attended with little if any discomfort, and interfere but little with the patient's sleep. There is, therefore, less heat in the canal and the erethism is mild or absent.

We constantly see cases of primary anterior gonorrhœa in which, though the purulent discharge is profuse, even sanguinolent, the inflammatory symptoms are not strongly marked and the patient's sufferings are correspondingly mild. Indeed, we see cases of profuse discharge in which patients make little if any complaint, though the inflammatory phenomena seem well marked. This may also be observed in cases in which the symptoms have been acute and intense.

In favorable cases of acute anterior urethritis a cure may be brought about in from six to eight weeks, in which event the patient may consider himself a very lucky man. We occasionally see, however, some patients get well in three or four weeks. These favorable cases generally are instances of the result of careful hygiene and discreet regimen, combined with judicious and efficient treatment. In private practice it is very often impossible to place patients at rest, and they thereby are unable at first to avail themselves of one of the most important means of cure. Even in hospitals it is a most difficult task to keep such patients in bed. Therefore, in a large number of cases gonorrhœa runs on in patients who cannot follow the requirements of strict regimen, hygiene, and treatment. As a result the acute stage passes into the subacute or declining stage, which may last many months. In such cases the more or less scanty or copious discharge is the most prominent symptom. Sometimes mild or severe burning is experienced in urination even in a declining gonorrhœa.

In this declining stage annoying relapses are quite frequent. Sometimes these relapses are mild, and again they are severe in character. They usually grow less and less severe, and then a cure follows. Most instances of relapse are due to the carelessness and heedlessness of the patient, who indulges in alcoholics and highly-seasoned food, in venery, and in active exercise. Very often the abstinence from sexual intercourse necessitated by the gonorrhœa induces a condition of erethism in the patient, which gives rise to nocturnal emissions and brings on a relapse. Then, again, the tissues of some patients seem prone to become inflamed



and slow to return to a normal condition, and in such subjects relapses are common. It is said that scrofula, rheumatism, cachexia, poor nutrition, and the syphilitic diathesis may be at the bottom of this morbid tendency; and perhaps they are.

It is usually in the course of or as a result of these relapses, after first and later infections, that the gonorrhœal process seems to localize itself in certain portions of the urethra—namely, the bulbous portion, the spongy portion, at the peno-scrotal angle, the portion of the urethra immediately anterior to this, and in the fossa navicularis. In many cases a latent inflammation remains in one or more of the urethral crypts and follicles. Then external irritation develops this chronic condition into an active stage, when a greater or less segment of the urethra becomes involved. It is to the persistency of these relapses that the development of stricture of the urethra is due.

Many patients regard these relapses at periods more or less remote from the original infection as new infections. They are really, in many instances, ephemeral suppurations induced in a chronically-inflamed patch or segment of the urethra, which commonly cease on the removal of the exciting cause or as a result of proper treatment. It is these relapsing suppurations which laymen often speak of so slightly when they say they would rather have an attack of gonorrhœa than a bad cold. They are usually promptly responsive to treatment, and in consequence of the rapidity of cure in such cases certain methods of treatment, as injections of no particular energy or value, come to have a great reputation.

Besides the foregoing objective and subjective symptoms of gonorrhœa, there are certain intrinsic conditions of the disease which must be studied by means of the microscope and by a study of the condition of the urine. These studies are absolutely essential to the systematic treatment of the disease.

Much information as to the course of acute anterior urethritis may be gained from a systematic microscopical study of the secretion. We have already given the facts concerning the onset of the infection. (See page 63.) When the suppuration is at its height it will be seen that the whole microscopical field is covered with pus-corpuscles, and when it is very severe it will be found that a proportionately large number of these cells contain gonococci. As the process improves, though the pus-cells are still numerous, the number of them which contain the microbe will be smaller. Then we observe a diminution in the amount of suppuration and the gradual decline in the number of the gonococci. As the declining stage advances epithelium becomes mixed with the pus-corpuscles, and then, under favorable circumstances, the latter grow less numerous, while the epithelial element becomes more copious. Then the pus-cells finally disappear, and soon after the epithelial cells cease to be proliferated, and a cure results.

Much light is also thrown on the progress of a case of acute anterior urethritis by the examination of the urine. As we have already seen, in the prodromal stage the urine is at first clear, but contains little rice-like or suet-like masses, which may look like little balls or flakes or even threads. Then, perhaps for a few hours or for a day, there may be a further admixture of mucus in small quantity. Usually a marked change then ensues. The urine becomes quite opaque, and looks very much as

if Indian meal had been mixed with it. This opacity increases, and becomes quite intense in the acme of the infection, in the second and third weeks and even later. The purulent secretion may, as it escapes from the urethra, seem very copious, but its quantity can be better judged after the patient has held his water from four to eight hours. If it is then passed and allowed to stand for several hours, the pus will settle to the bottom in a broad, quite firm, seemingly homogeneous yellowish-white, even greenish, layer, perhaps an inch or more thick. In cases of hemorrhage a thin red layer of blood rests on the pus-layer. Over this pus-layer will be seen a grayish nebulous spider-web-looking, very easily movable layer of mucus, which at first will not be as thick as the underlying pus-layer. The further progress of the case could be made out, if necessary, by the daily study of the urine, without any information from the patient. As the suppuration grows less, the urine becomes less cloudy and opaque and rather more milky-looking. Then, day by day, the pus-layer grows less thick, is less compact, and is exceeded in thickness by the supernatant mucous layer. In many cases, just as the pus declines and the urine is less opaque than before, the quantity of mucus is so pronounced that an opacity comparable to that of mucilage is noticed. This opacity usually clears up slowly, but it may exist, sometimes, for long periods. As the pus-layer decreases in thickness it is seen to consist of small and large clumps and masses, while the mucous layer is further increased in volume. As the morbid process goes on to decline these clumps become less plentiful, while the mucous layer remains in an unchanged condition. Then these clumps become smaller and smaller, until at last, just before the cessation of the suppuration, they are so minute (pinhead or pinpoint size) that they do not sink, but are held in suspension by the mucous layer, which is more transparent than previously, and usually floats just below the surface of the fluid. The next favorable change is the disappearance of these very minute masses of pus (with sometimes epithelial admixture), leaving the mucous secretion, which may be for a time above normal in quantity.

The foregoing description applies to cases which do not hitch or halt in the declining stage. Unfortunately, as we have seen, in many cases various causes tend to retard the cure in the declining stage. Then we find scarcely, if any, discharge at the meatus in the morning, but examination of the urine shows, after the clumpy pus has disappeared, first mucus and the mucous threads already described, and then mucus and the firmer form of threads. In this condition the process may remain indefinitely for weeks and months, and even years. At first the threads are formed of pus-cells in excess of epithelium, and thus the ratio may remain for a long time. Then, as the cure takes place, the pus-cells decrease in number and the epithelial cells predominate in the microscopic field. In auspicious cases the pus then disappears, while epithelium may still be discovered. Then, when the integrity of the mucous membrane has been restored, nothing but a normal amount of mucus can be seen. The foregoing facts are amplified on page 73.

In these frequent cases of chronic urethritis or gleet the pus and epithelial cells continue present in thread form, often with discouraging persistence.

It is always very important to accurately know how deeply in the

urethra the infection has spread. In acute gonorrhœa the urine may be examined by what is called Thompson's or the two-glass test. If the morbid process is still confined to the anterior urethra, and the purulent secretion is quite copious and the urine is voided into two glass cylinders or beakers, it will be seen that the jet passed into the first vessel is turbid, while that in the second is transparent and clear. It is then evident that the morbid process is still localized in the anterior urethra. If the infection has reached the posterior urethra and the secretion is still quite copious and the patient passes his urine into two vessels, the urine in the first will be opaque, and so will that in the second vessel be. Up to this stage, therefore, the two-glass test is valuable in cases of gonorrhœa of the totality of the urethra. In other words, just as long as the secretion is quite copious this two-glass test will yield accurate information: but when the morbid products become much less in quantity, less fluid in consistency, and more inspissated, then they are usually washed out with the first flow of urine, which flushes and cleans out both the anterior and posterior urethræ. It follows, therefore, that in all cases of declining gonorrhœa with scanty secretion, and in cases of chronic gonorrhœa, the two-glass test will be found wanting, and will give no information as to whether the morbid process is confined to the anterior or posterior urethra, or at best misleading information. It is evident that under these circumstances a knowledge of the condition of the posterior urethra can only be obtained by thoroughly cleansing the anterior urethra, and then allowing the patient to pass his urine into one or into two glasses if a knowledge of the condition of the bladder is essential. It is very important that this cleansing process should be thoroughly done, and that the urethra should not be irritated or damaged in any degree in the operation. Consequently, we must first consider what procedures should be avoided, since they are advocated by some authors.

In the declining stage of gonorrhœa and in many cases of chronic posterior gonorrhœa the use of the endoscope must be interdicted. The field of usefulness of the endoscope in troubles of the posterior urethra is quite narrow, and when the inflammation of these parts is hovering between an acute and a chronic condition, its use may be attended by bad results. It is well, therefore, to dismiss this agent of diagnosis from our minds under these circumstances.

The next method is one largely used in France. It consists in the introduction of a good-sized *bougie à boule* down as far as the bulbous portion of the urethra, and then in gently scraping backward and forward with the hope of bringing away any secretion on the proximal end or neck of the bulb. This procedure is a bungling and unsatisfactory one, rarely productive of any result, and very liable to set up acute inflammation. It is a good general rule not to introduce a *bougie à boule*, a sound, or metallic instrument of any kind into the urethra, even as far as the bulb, until several months have elapsed since the onset of the infection.

The next method is equally as objectionable and as faulty. It consists in the introduction of a long, flexible applicator in the end of which a small ball of absorbent cotton is attached. The object is to wipe or swab out the canal. This procedure is followed by uncertain results, and may lead to inflammatory reaction.

Still another method is to introduce a short endoscopic tube as far as



the bulbo-membranous junction, and then employ the last procedure. This method is fallacious, and may cause an exacerbation of the gonorrhœal trouble. In all these methods of cleansing the anterior urethra lurks the danger of infecting the posterior urethra in case that region is yet intact. All these methods have their objections and drawbacks; therefore we resort to washing out the anterior urethra.

Several methods are employed in the washing out or lavage of the anterior urethra. The simplest one is to pass down to the bulb (5 to 6½ inches usually), the patient being in a standing position, a soft-rubber velvet-eye catheter lightly smeared with glycerin, of No. 10 or 12 French scale, or a Mitchell reflux catheter, and then, by means of the hand-syringe, to inject five to ten ounces of quite warm borax, boracic-acid, or salt water. The fluid should be thrown in slowly, and collected as it runs out of the meatus. It may be well for a few seconds to compress the meatus, and thus to cause the stream to exert greater force upon the urethral walls. When the water flows from the meatus clear and without admixture, it is fair to assume, if proper care and technique have been used, that the anterior urethra is cleansed. The patient may then pass his urine into one or two glass cylinders or beakers. If the quantity of urine in the bladder is yet quite small, it is very probable that the prostatic urethra has not yet become part of the bladder, and that its secretion has not been regurgitated into or mixed with the vesical contents. Consequently, the first jet of urine will carry away all secretion from the prostatic urethra. The second stream, coming directly from the bladder, will give information as to its condition, and will determine whether the infection has invaded that viscus.

Now, in the event of the patient having much urine in his bladder, it is safe to assume that the prostatic urethra has been drawn into that viscus, and that its secretion is mixed with its contents. As a result of this condition it will be necessary to study the secretion with the microscope after it has settled, and to determine whether the tissue-elements have come from the posterior urethra alone or also from the bladder. It is always a good rule, therefore, to use lavage of the anterior urethra with a view of determining the condition of the posterior urethra. When the patient has only three or four ounces of urine in the bladder, the internal sphincter usually remains competent, and the prostatic urethra and bladder do not then form one cavity. It is very probable, when the morbid process in the posterior urethra is active and the secretion is thin and copious, that it tends to flow toward the bladder, since the internal sphincter is weaker than its external fellow. In this case the intermingling of the fluids occurs quite early. If, however, the secretion is thick and viscid and small in quantity, it will remain in the prostatic urethra until it is carried away with the first jet of urine, or it may become mixed with the urine in the fusion of the prostatic urethra with the bladder.

The secretion washed from the anterior urethra should be allowed to settle, and then should be examined microscopically for gonococci and tissue-elements. The urine in the first glass should be similarly treated. If two glasses have been used, the second urine may also be examined. The microscopical appearances of the secretion of the anterior and posterior urethra have already been described. (See page 74.) If the bladder

has been involved (and in most of the recent and even quite advanced cases the inflammation will have extended only to the portion near the neck and base), there will be found more or less pus and flat epithelium, due to catarrhal desquamation—a microscopic picture in striking contrast with that presented by the secretion of the posterior urethra. By these means, therefore, we determine whether the gonorrhœal process has stopped at the bulb of the urethra or whether it has invaded the posterior urethra, and still further involved a small or a large portion of the bladder.

We are now in a position to study the course of gonorrhœal infection in the posterior urethra. Before doing so, however, it is necessary to make a slight digression of an historical character.

In the year 1883, Guyon<sup>1</sup> put forth the claim that gonorrhœa in the vast majority of cases stopped at the *cul de sac* of the bulb, and that when not cured it usually localized itself there in a chronic condition. The cause of this localization was said to be the sphincteric action of the compressor urethræ muscle, which was dignified with the names intra-urethral barrier, membranous sphincter, and urethral diaphragm. In support of his views Guyon cited 103 cases of chronic gonorrhœa in which he claimed that it was proven that the anterior urethra only was involved in 74, and that the disease had extended to the posterior urethra in 29 cases. Guyon's views were quite generally received (with eagerness by Ultzmann and Finger), and they were spread broadcast by the ambitious thesis of his pupil, Jamin,<sup>2</sup> which was widely read. Thus we find that authors went so far as to claim that gonorrhœa proper involved only the urethra from the glans to the triangular ligament, and that when it extended to parts beyond this structure the process should be considered as only a complication of gonorrhœa, and not an essential condition. This is illustrated by the statement made by Ultzmann,<sup>3</sup> who says: "Gonorrhœal urethritis has a typical course. Beginning at the external orifice, the inflammation progresses farther backward, so that the bulb of the urethra is attacked in the fourth week, and the process ceases here in most cases." It was further claimed that this extension only occurred as a result of traumatisms (forcible and irritating injections, overwork, excessive motion, and operative manipulations) or under the influence of certain diatheses, rheumatic, tuberculous, scrofulous, and lymphatic. Through the influence of a justly great name these views of Guyon were quite generally accepted, except by Fürbringer,<sup>4</sup> who strongly opposed them. As time went on they were attacked by other scientific men. The first facts in refutation of Guyon's thesis were offered by Aubert,<sup>5</sup> who showed very clearly that by proper methods of investigation—namely, washing out the anterior urethra and lavage—posterior urethritis could be diagnosed in very many cases in the acute stage, and that it was of frequent rather than of rare occurrence. He further rendered clear the fact that in many cases

<sup>1</sup> "Leçons cliniques sur l'Urétrites blennorrhagiques, etc.," *Annales des Mal. des Organ. Gén.-urin.*, vol. i., 1883, pp. 333 et seq.

<sup>2</sup> *Étude sur l'Urétrite chronique blennorrhagique*, Paris, 1883.

<sup>3</sup> *Vorlesungen über Krankheiten der Harnorgane*, Vienna, 1892, p. 60.

<sup>4</sup> *Die Inneren Krankheiten der Harn- und Geschlechtsorgane*, 2d ed., 1890, pp. 402 et seq. (Also in 1st ed., 1884, p. 274.)

<sup>5</sup> "Sur l'État latent du Début de la Cystite blennorrhagique," *Lyon Médical*, June 15, 1884, pp. 197 et seq. (Dr. Goldenberg (*Medical Record*, Dec., 1888) advised lavage of the anterior urethra, with the view of ascertaining the condition of the posterior portion of the canal.)

of posterior urethritis there were no symptoms (or at most they were insignificant ones) present which would lead to a suspicion of the involvement of the posterior urethra. The demonstration of this fact was of the utmost importance, for the reason that Guyon's statement was quite generally accepted, that, when in the course of gonorrhœa the posterior urethra was attacked, there were *inevitably* symptoms present of such an extension. These statements were confirmed by Éraud,<sup>1</sup> who claimed, with the authority of investigation, that the posterior urethra is invaded in nine-tenths of all cases of acute gonorrhœa, and stated that in 155 cases scarcely one-third complained of symptoms referable to an inflamed posterior urethra. These observations were confirmed by Jadassohn,<sup>2</sup> who also used lavage of the anterior urethra in his experiments. In 163 cases of acute and chronic gonorrhœa (even in cases lasting several years) this observer shows that in  $87\frac{7}{10}$  per cent. the posterior urethra was involved, while in only  $12\frac{3}{10}$  per cent. the morbid process was localized in the anterior urethra.

Further evidence was given by Róna, who at first<sup>3</sup> claimed that in gonorrhœa lasting eight or ten weeks the posterior urethra was involved in 62 per cent., and in 66 per cent. of more advanced cases. In a later communication<sup>4</sup> this observer claims that the whole urethra is attacked in 80 per cent. of acute gonorrhœas, and that it is an error to state that posterior urethritis is a complication of acute urethritis, since it is only a further extension of the process.

Testimony to the same effect is given by Letzel, Heisler, and Lanz, whose observations are more satisfactory than some of the preceding, since among the statistics thus far given cases were included in which several infections had already occurred, whereas in the statistics now to be given the cases were those of first infection with gonorrhœa.

Letzel's<sup>5</sup> material consisted of 53 cases of seven and ten weeks' duration, in only 4 of which ( $7\frac{5}{10}$  per cent.) the disease remained localized in the anterior urethra.

Heisler's<sup>6</sup> results are based on the study of 50 cases, watched, for the most part, from the first days of the infection, and his figures are as follows:

In the first	week,	10 cases = 20 per cent.
" second	"	17 " = 34 "
" third	"	7 " = 14 "
" fourth	"	10 " = 20 "
" sixth	"	2 " = 4 "
" seventh	"	2 " = 4 "
" third month,	1 "	= 2 "
" fourth	"	1 " = 2 "

<sup>1</sup> "De l'Urétrite postérieure Simple ou Compliquée," *Lyon Médical*, vol. xxviii., 1885, pp. 113 et seq.

<sup>2</sup> "Beiträge zur Lehre von Urethritis posterior," *Verhandlungen der Deut. Dermat. Gesellsch. zu Prag*, Vienna, 1889, pp. 172 et seq.

<sup>3</sup> "Vermag der Compressor Urethræ das Weiterschreiten der akuten Gonorrhœe zu Verhindern," *Orvosi Hetilap*, No. 43, 1890, and *Monatshefte für Prakt. Dermatologie*, vol. xii., 1891, pp. 162 et seq.

<sup>4</sup> "Neuere Beiträge zur Pathologie der Akuten Urethritis blennorrhagica," *Ungar. Arch. für Medizin*, Band i. 5 and 6 Hefte, pp. 350 et seq.

<sup>5</sup> "Ueber die Häufigkeit der Beteiligung der Urethra post. am Gonorrhoeischen Entzündungsprozesse, etc.," *Internat. Centralblatt für die Physiologie und Pathologie der Harn- und Sexual-Organen*, vol. ii., 1890-91, pp. 284 et seq.

<sup>6</sup> "Ueber die Zeit und Ursache des Ueberganges der Gonorrhœe auf die Pars Posterior Urethræ," *Archiv für Derm. und Syphilis*, vol. xxiii., 1891, pp. 761 et seq.



It is probable that in some of these cases, which were not seen quite early enough, the invasion of the posterior urethra occurred earlier than has been stated.

Lanz's<sup>1</sup> statistics of 61 cases are in striking confirmation of Heisler's. They are as follows:

In the first	week,	12 cases,	=	$19\frac{7}{10}$	per cent.
" second	"	18	"	=	$29\frac{5}{10}$ "
" third	"	7	"	=	$11\frac{5}{10}$ "
" fourth	"	6	"	=	$9\frac{8}{10}$ "
" fifth	"	5	"	=	$8\frac{2}{10}$ "
" sixth	"	7	"	=	$11\frac{5}{10}$ "
" seventh	"	2	"	=	$3\frac{2}{10}$ "
" eighth	"	1	"	=	$1\frac{6}{10}$ "
" ninth	"	2	"	=	$3\frac{3}{10}$ "
" eleventh	"	1	"	=	$1\frac{6}{10}$ "

These observations show very clearly that in more than 50 per cent. of the cases the invasion of the posterior urethra took place within the first ten weeks of infection, and that this extension occurs in from 60 to 68 per cent. of cases in the first three weeks. The percentages of occurrence are less for the few succeeding weeks, but they are, as will be seen, sufficiently large to warrant the assertion that in most cases of gonorrhœa involvement of the posterior urethra occurs within the first eight weeks, and may occur earlier. My own observations in private and public practice, made with much care upon 85 cases, are in accord with those of Letzel, Heisler, and Lanz.

It follows, therefore, that the opinion heretofore entertained, that gonorrhœa, as a rule, limits itself to the anterior urethra, localizing itself chiefly at the bulbous portion, is wholly incorrect, since the reverse is true—namely, that, as a rule, the infection spreads in between 80 and 90 per cent. of cases through the entire length of the urethra, and only exceptionally in a minimum of cases is limited to the anterior urethra. The contention, therefore, that posterior urethritis is a complication of anterior urethritis is false.

## CHAPTER X.

### TREATMENT OF ACUTE URETHRITIS, OR GONORRHŒA.

THE treatment of gonorrhœa varies according to the stage of the disease and the condition of the patient. In the majority of cases gonorrhœa is seen in the acute stage, with its well-developed discharge and inflammatory symptoms. Exceptionally patients present themselves a few hours or a day or two after the onset of the prodromal stage, in which the discharge is a mucous secretion containing epithelial cells and gonococci, and perhaps no pus. In every instance, if possible, when a patient presents

<sup>1</sup> "Ueber die Häufigkeit und Zeit des Auftretens des Urethritis posterior bei der acuten Gonorrhœe," *Archiv für Derm. und Syphilis*, vol. xxvii., 1894, pp. 213 et seq.

himself in this stage, the secretion should be examined by means of the microscope, which at this time gives much really important information.

**The Abortive Treatment.**—With the discovery of the microbic origin of gonorrhœa the old idea of aborting the disease took new life, and to-day a vast literature (the greater part of which is utterly worthless) exists upon this question. Many patients, for reasons more or less urgent and even imperative, desire to rid themselves with the utmost speed of this virulent infection. Then, again, when the severe suffering and the dangerous sequelæ incident to gonorrhœa are considered, the surgeon naturally feels that if he can abort the disease it is his duty to do so. There can be no doubt that gonorrhœa can be aborted very early in its course, but cases in which this is possible are not common. Before attempting this procedure the case must be studied carefully in the light of our knowledge of the gonorrhœal process. We have already seen that in the prodromal stage the gonococcus multiplies and spreads like a sod over the mucous membrane, and gains a hold on a limited portion before it begins its inward invasion. If the disease can be caught in this condition, there is a reasonable probability of aborting it. Now, by means of the microscope this condition can be made out with the utmost clearness. When on the first and perhaps the second day the patient complains of a little tickling or burning sensation, and the mucoid secretion, containing little whitish-gray particles resembling suet or rice, shows nothing but epithelial cells and gonococci, but no pus-cells, then, the patient being desirous and urgent, the surgeon should make an effort to abort the disease. Under these circumstances he can offer a reasonable hope. He, however, should make it very clear to the patient's mind that the treatment may be quite painful, and that it may fail. However, even when the reaction following the treatment is severe, it is readily calmed in a few days. The method of procedure is as follows: The patient stands and urinates, and the urethra is injected, by means of a penis-syringe or of a 12 French soft catheter introduced three and a half inches into the urethra, with one or more ounces of very warm saturated solution of boric acid. Then a Weir's meatoscope is introduced, the obturator withdrawn, and an applicator charged on its end with a tuft of absorbent cotton, large enough to gently spread the urethral lumen and soaked in a watery solution of nitrate of silver, 15 grains to the ounce, is pushed down the tube, and the cotton is allowed to protrude just beyond it. Then the tube and the applicator are very slowly withdrawn, the surgeon gently rotating them from side to side. After this operation the patient should lie down and apply graduated cold either by means of an ice-bag or of ice-water on lint to the penis. A cathartic should be given and low diet allowed. The reaction may be slight, and it may be very severe. Usually in a few hours the discharge becomes decidedly purulent and copious, and urination is attended with scalding. If success has been attained, the suppuration (for a substitutive inflammation has been produced) gradually grows less, the secretion becomes thin, watery, and perhaps a little bloody, and disappears in four or five days. In some cases an astringent injection may be required to cause the mucous membrane to become healthy. In the event of failure the acute stage develops with perhaps much severity.

By this procedure the gonococci are destroyed, and the epithelial layer upon which they are seated is so necrosed by the caustic that it is thrown

off. In a few days it is replaced, the engorgement of the vessels and the oedema of the tissues subside, and a healthy condition is left.

The abortive treatment of incipient gonorrhœa was strenuously advocated by the late Dr. Diday, who carried it to an extreme. This surgeon advised the injection into the urethra of solutions of nitrate of silver, 1 to 20, and even 1 to 7, of water. According to Diday, the criterion to be guided by is the pain<sup>1</sup> produced, which should be so severe and even atrocious as to cause shock to the patients. In order that the abortive fluid should have full opportunity to penetrate the mucous membrane it should be held in the urethra from fifteen to twenty seconds, and even two minutes. Diday advises that the patient should be informed beforehand of the severity of his suffering, and that if he refuses the treatment the surgeon should not insist, but should consign him to the use of his "carafe d'orgeat." Thiéry,<sup>2</sup> on the other hand, thinks we should be more persuasive, should mildly deceive him as to his sufferings, and frighten with the lugubrious account of a prolonged gonorrhœa and its painful and dangerous sequelæ. It may be remarked that such a course might work well if a successful result is obtained, but in the event of failure the relations between the patient and his physician might be more or less strained.<sup>3</sup>

A less radical and less painful procedure consists in the introduction to the extent of three or four inches into the already cleansed urethra of a No. 12 F. soft-rubber catheter and the injection of several antiseptic solutions at the temperature of 100° F. For this purpose permanganate of potassa, 1:1000 or 1:2000, may be thrown into the urethral canal twice a day; or bichloride of mercury and water, 1:2000 or 1:5000, or of nitrate of silver, 1:3000 or 1:5000, may be used. In the quite early stage these retrojection fluids may be used of much greater strength than can be borne when the acute stage is well developed. By these means I have been able to abort gonorrhœa when it was in the exact condition already described.

When the gonococci have penetrated into the epithelial layer, particularly when they have reached the region of the vessels and have produced an exudation of leucocytes, when we have under the microscope pus-

<sup>1</sup> "Traitement ultra-abortif de la Blennorrhagie," *Lyon Méd.*, May 25, 1890, pp. 109 et seq.

<sup>2</sup> "Essai de Traitement méthodique de la Blennorrhagie, etc.," *Annales des Mal. des Org. Gén.-urin.*, 1891, pp. 395 et seq.

<sup>3</sup> The extent to which the hunt for the gonococcus is carried in the antiseptic abortive treatment of gonorrhœa is strikingly shown in the abortive method gravely proposed by Huguet (*Ann. des Mal. des Org. Gén.-urin.*, May, 1889). This author advises that the urethra shall be well sponged out by means of a long hair-brush having a calibre of 12 French scale. The urethra is thoroughly cocaineized, and then the brush, which is similar to that used by smokers to clean out the stems of their pipes, is pushed forward and backward until a débris of epithelium and blood is produced. Then when the mucous membrane is denuded of its epithelium, sublimate injections (1:10,000) are used. Urination is said to be a little painful, but a cure is claimed in seven or eight days.

The climax in the abortive treatment has been reached by Boureau (*Bull. de la Société franç. de Derm. et de Syph.*, 1893, pp. 517 et seq.), who has invented a *porte topique* or *uréthro-mèche*, which is a miniature lampwick made of cotton with loose strands, having a calibre of No. 12 French scale. This cylinder of cotton is smeared with vaseline mixed with sublimate (1:1000), and then introduced into the urethra by means of a soft olivary bougie. Boureau placed gonorrhœal pus in the urethra of three men, and within twelve hours applied his sublimate mèche. All three escaped gonorrhœa. He claims to have cured many cases by this treatment. What next may we expect?



cells and epithelial cells, the abortion of gonorrhœa is a very difficult and very often indeed an unsuccessful task. In these conditions either of the first-mentioned retrojections may be given. They should be quite copious, twelve ounces or a pint being thrown up at each session by the surgeon himself or his assistant. If a perfect cure is produced, we may say, with Ricord, that some good deity has saved the patient.

**General Considerations on Treatment.**—With the onset of the acute stage an entirely different line of treatment is to be followed. While we know that the gonococcus is the *materies morbi* of the virulent process, we must not lose sight of the fact that besides it we have an intense inflammation involving the mucous membrane and the submucous connective tissue to treat, to ameliorate, to curtail, and to cure. The objective point in the treatment of acute gonorrhœa, according to the doctrine of Neisser's followers, is the gonococcus, so that Friedheim<sup>1</sup> says that "the most appropriate remedy for the acute purulent stages is one that—1, kills the gonococcus; 2, that does not injure mucous membranes; 3, that at least does not increase the inflammatory symptoms if it does not lessen them." In this scheme too much prominence is given to the necessity of training our guns on the very active and virulent microbe, and too little is said about general practical therapeutical measures which will allay inflammation of tissues. To my mind, our duty is—1, to try to abort the disease in proper cases; failing in that effort, 2, to use means to lessen the severity of the inflammation and to reduce the patient's sufferings; 3, to cut short the acute stage as much as possible; and, 4, to thoroughly remove the morbid process in the declining stage. In this treatment, of course, it is assumed that the remedies used will allay the inflammation in which the gonococcus luxuriates. Then, in proportion as we cure the inflammation of the tissues, the condition which favors the virulent action of the gonococcus is so altered that the microbe perishes in uncongenial soil. It is true that we must destroy the gonococcus, but this end is brought about mainly by indirect means.

Much has been written about the prompt cure of the acute stage of gonorrhœa by means of copious injections, irrigations, and retrojections of antiseptic solutions, but when the results are judiciously studied it will be seen that in the main they are little if any better, and sometimes they are worse, than those obtained by the older methods. The trouble with these antiseptic methods of treatment is that they are narrow in view and scope, and only aim to kill the gonococcus and thus relieve the patient of his ill. But it must be conceded that good will result from the claims, the methods of procedure, and from the results obtained by these antiseptic enthusiasts. They have been the sappers and the miners of the urethra, and they have demonstrated, contrary to our early belief, that catheters can be introduced, when great care is used, into the urethra the seat of acute gonorrhœa, and that copious injections can be given without ill, and perhaps with good, effect. The error committed is in making the procedures a routine treatment rather than an accessory and elective measure to be adopted when the indications point to their rational use.

There are very many methods prescribed for the treatment of gonorrhœa, some of which are good, or at least produce no harm. Then, again,

<sup>1</sup> "Zur Injectionsbehandlung der Acuten Gonorrhœe," *Archiv für Derm. und Syph.*, vol. xxi. pp. 525 et seq.

there are methods which are impracticable, unwieldy, unsafe, and many are utterly chimerical and even dangerous.

A methodical, safe, and efficient treatment will be described, which the experience of many years has convinced me will prove of benefit to any one who carefully employs it.

In order that this chapter shall be complete, and shall serve as a store-house of reference, all the new methods of treatment, new drugs, and the more prominent of the new instruments for urethral treatment, will be mentioned or described. While little of very useful character or of practical application can be obtained from these descriptions, they will at least present to the reader an up-to-date view of progress in the treatment of gonorrhœa.

**Treatment of the Acute Stage.**—The surgeon should carefully examine the penis of every man presenting himself for the treatment of gonorrhœa. He thus familiarizes himself with the anatomical peculiarities of the organ, and can thus foresee and take measures to prevent complications. Thus a long tight prepuce may lead to balanitis, to phimosis, and to paraphimosis, or even to lymphitis and adenitis. These complications are readily prevented, but if they supervene the sufferings of the patient are much increased and his cure is greatly delayed. Then, again, the conformation of the meatus should be taken into consideration, with the view of ordering for the patient a syringe best adapted to the parts. Should there exist a tendency to balanitis or if any warts are present upon or around the glans, attention must be paid to them. In a case of very small meatus an incision will be required as early as it is practicable in the course of the virulent inflammation.

Assuming, now, that we have to treat an acute case, either as a first or a later infection, the most important measure is absolute rest, preferably in the recumbent position, but the majority of patients are unwilling to thus submit. The great advantages to be attained, however, should be thoroughly explained to them. Taking cases, therefore, as we find them, they should be enjoined to walk and exercise as little as possible, to spare themselves in every way, to avoid muscular exertion, to ride rather than walk, to sit rather than stand, and to lie down as often and as long as possible. Horseback riding, bicycling, out-door sports, dancing, jumping—in fact, any form of severe bodily exercise—are to be absolutely avoided. In very bad cases, in which the inflammation is so active that a patient is forced to seek the recumbent position, it is well to apply cooling lotions on lint to the organ or to employ an India-rubber ice-bag. For all itinerant cases in the acute stage a nicely-fitting and comfortable suspensory bandage should be ordered at once. Care should be taken that the opening for the penis is sufficiently large, and that the urethra is not in any degree pressed upon by the bandage.

The patient must be informed of the great virulence of the urethral pus, and that contamination of the eyes with it may result in the loss of one or both of these organs. Therefore the hands should be thoroughly washed immediately after handling the penis. Too much stress cannot be laid upon this injunction.

Careful attention to diet is an important consideration. It should be light and plain and in moderate quantity. All highly-seasoned foods, salads, gravies, soups, and condiments should be absolutely interdicted.

Coffee, cocoa, beer, alcoholic liquors, ginger ale, and asparagus should be avoided. The utmost cleanliness of the genital parts should be recommended, using by preference carbolic-acid soap. All sexual excitement must be sedulously avoided, and the patient should be warned against lascivious thoughts and suggestive pictures.

Much care is necessary in adapting dressings to the penis for the purpose of catching the discharge. Patients should be warned not to place pieces of lint or cotton over the urethral orifice, nor to use stockings or bags at the bottom of which a bird's-nest-shaped wad of cotton is placed, since by all of these procedures the pus is injuriously kept against the meatus and glans. India-rubber condoms are also objectionable. The most cleanly and efficient method of dressing the penis is that portrayed in Figs. 51 and 52, which I have used many years. A piece of old linen

FIG. 51.

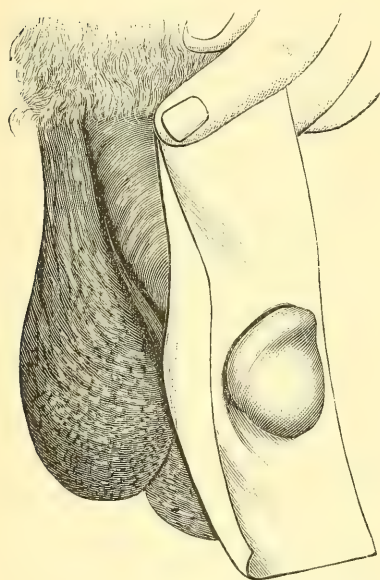
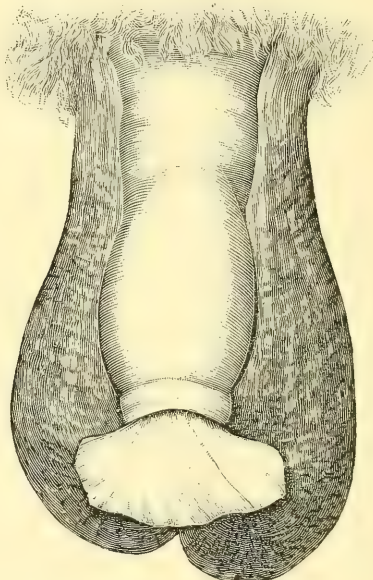


FIG. 52.



Dressings for the penis in acute gonorrhœa.

or muslin or two thicknesses of absorbent gauze about four inches square, in the centre of which is a small oval aperture, is slipped over the exposed glans behind the corona, and the prepuce is then pushed forward. From its orifice the linen protrudes and catches all of the secretion. If the patient has no foreskin to thus hold the bandage, a piece of linen or gauze four inches by six may be wound around the whole penis, and there retained by means of a small piece of adhesive plaster or a loosely-fitting India-rubber band. All these dressings for the penis should be destroyed by fire, or at least thrown down the water-closet. The surgeon should emphasize this important prophylactic measure. If practicable, the penis may be suspended by means of the under-clothes along the fold of the groin. The utmost care and delicacy must be observed in handling the organ: squeezing to cause pus to exude is very harmful, and pressure of any kind



must be avoided. Patients sometimes take the penis from their trousers by unbuttoning one or two buttons, and then they violently pull the organ out, very often with unnecessary force. This procedure should be interdicted. Tightly-fitting pantaloons sometimes cause an increase of the inflammatory process.

During the acuteness of the attack, purgation at intervals of three or four days is very essential. For this purpose two to four compound cathartic pills or ten grains each of calomel and supercarbonate of soda taken at night are excellent. Saline cathartics and the natural cathartic waters are to be avoided, since much of the sulphate of magnesia passes off in the urine and irritates the urethra.

Early in the acute or inflammatory stage of gonorrhœa strong stimulating and astringent injections and oleo-resins are contraindicated. The chief object of our therapeutics at this time is to render the urine moderately alkaline, bland, and as little irritating as possible. For this purpose there is no better remedy than the bicarbonate of potassa. In general, the following prescription may be used:

R̄. Potassæ bicarbonatis,	℥j ;
Syr. aurantii corticis,	℥ij ;
Aquæ,	℥vj.—M.

Dose for an adult, one tablespoonful in a wineglass of water three times a day an hour after eating.

In very acute cases I have used for many years the following prescription, containing hyoscyamus, which acts beneficially as a sedative to the genito-urinary tract:

R̄. Potassæ bicarbonatis,	℥j ;
Tr. hyoscyami,	℥ss ;
Aquæ,	℥viiij.—M.

To be taken in the same manner as the foregoing prescription. The citrate and acetate of potassa may also be remembered and used in the same proportions.

Flaxseed, sassafras-pith and slippery-elm teas, and gum-arabic and barley-waters, pleasantly flavored, may be taken as beverages. They are regarded as beneficial by many physicians, and patients sometimes think that they render urination less painful. Under any circumstances they are harmless. Vichy, Apollinaris, Poland, Bethesda, Stafford, and soda waters are pleasant and suitable drinks, and to them may be added a few grains of supercarbonate of soda.

Locally, the most important measure is the immersion of the penis in *very hot* water for fully fifteen minutes three times a day, by which means the pain and soreness are relieved and the redness and swelling reduced. A small quantity of laudanum or of fluid extract of belladonna may often be with benefit added to the hot water. In the early days of the inflammatory stage baths at a temperature of 96° or 98° Fahr. are of much benefit in tending to produce a comfortable night's sleep. If possible, the whole body should be immersed; if not, the hip-bath may be used. Immersion of the penis in very hot water during urination is often productive of amelioration of the pain.

For the prevention of erections and chordee, besides the observance of a rigid hygiene, the patient must retire early and sleep on his side, and never on his back, on a hair mattress, with light bed-clothes. It is always well, if possible, to avoid the use of anodynes, and much benefit has been derived, in my experience, from the use of the following injection in cases of persistent nocturnal erections and chordee:

R. Liq. morphiae Magendie,	ʒij ;
Cocaine muriat.,	gr. vj-viiij ;
Aquæ,	ʒij.—M.

Of this one or two drachms may be carefully and slowly thrown into the urethra, and there retained for fully five minutes, just before retiring. Or the following may be used in the same way:

R. Extracti opii aquos,	ʒij ;
Aquæ,	ʒiv.—M. and filter.

Signa: injection.

For immediate use any cold body, such as a flat-iron, may be applied to the perineum and the under surface of the urethra, or cold-water affusions may be tried. Owing to idiosyncrasy, cold is not beneficial in some cases, while hot-water immersions are very efficacious. I have seen much relief in some very severe cases of chordee by the use of the following prescription:

R. Chloroformi,	ʒj ;
Tr. belladonnæ,	ʒss ;
Liniment. saponis,	ʒiiss.—M.

A small quantity of this may be applied over the affected part on lint or cotton, and there kept for some time. I have also seen benefit in severe cases by allowing sulphuric ether to evaporate from a strip of old linen wound around the penis. Care must be exercised that the chloroform and ether vapors do not reach the head of the penis.

In those cases in which there is much malaise, nervousness, and worry, when hyoscyamus fails, laudanum in doses of two or three drops in a small quantity of water, taken three, four, or five times a day, is productive of a sense of comparative comfort during the day and of sleep at night. Besides being nauseous and irritating to the stomach, camphor has proved a very unreliable remedy in my hands. The monobromide of camphor seems to have a good effect in some cases when given in full and repeated doses. Lupuline in any form is at best a nauseous remedy, possessing very little therapeutic effect.

In many cases, besides the erections and chordee, there is considerable vesical irritation, with frequent and imperious desire to urinate, together, perhaps, with pain in the perineum, loins, scrotum, and groins, due to the onward extension of the infection. In such cases laudanum, as just advised, may be used, or suppositories may be ordered, as follows:

R. Morphiae sulphatis,	gr. ij ;
Ext. belladonnæ,	gr. iiij ;
Ol. theobromæ,	q. s.

To make suppositories No. iv.

One of these may be introduced into the rectum just on retiring, and a second during the night if necessary. Digitalis is not uniformly reliable, and gelsemium in potent doses is sometimes dangerous from its depressing action upon the heart. In many cases calm sleep may be induced by using the following combination, which is not followed by unpleasant effects :

R̄. Potassii bromidi,	Ḑxvj ;
Chloral. hydrat.,	gr. lxxx ;
Liq. morphiæ Magendie,	gtt. lxxx ;
Syr. simplicis,	
Aquæ,	āā. ʒj.—M.

Dose, one teaspoonful in a little water on retiring, and it may be repeated during the night if necessary. In some cases, owing to tolerance, the quantity of all of the active agents may be suitably increased. Bromide of potassium alone proves of much benefit in the milder order of cases.

Physicians must use the utmost caution in giving anodynes in gonorrhœa: they must be given in the smallest doses and repeated as seldom as possible, and discontinued at the earliest moment upon the relief of the urgent symptoms. Antipyrine very often is very soothing and beneficial in acute gonorrhœa and in various forms of cystitis. This remedy may also be given in combination with phenacetin.

The tendency of gonorrhœa being toward disturbance of the nervous system and debility, much circumspection is required in preventing them. Purgation must not be pushed to the extent of weakening the patient, and if signs of falling away show themselves, a rather more liberal diet should be allowed so soon as admissible. Milk may be used generously, replacing water as a beverage. If patients remain indoors, they should be allowed a daily ride in the open air in the cars, in preference to carriages and coupés.

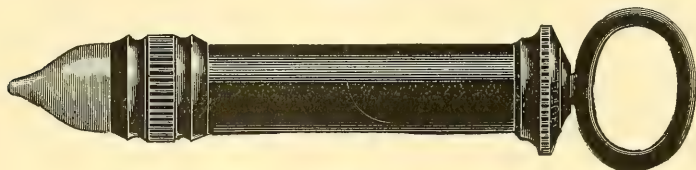
Free drinkers suffering from acute gonorrhœa often complain bitterly of the loss of their accustomed stimulant, and even show physical evidences of it. Such cases may be benefited and placated by giving them from a half to one drachm of the fluid extract of coca at the periods of depression. Such is the restraint enforced upon patients that it is well to allow them to smoke with moderation during an attack of gonorrhœa.

Assuming now that the extreme severity of the acute stage is moderating, we should take active but conservative measures to still lessen its activity and to, if possible, abbreviate it. The immersions in hot alkaline water already mentioned should be steadily and methodically kept up. Then, at the same time with the immersions, injections should be cautiously begun. Care should be exercised in selecting a syringe which should hold two or three drachms, should work easily, and its nozzle, which should be perfectly smooth, should fit readily into the meatus. The syringes made by the Butler Rubber Co. answer every purpose, and the three here portrayed will be useful in any case. Fig. 53 shows a particularly useful instrument holding three drachms; its nozzle is conical in shape and soft and compressible, being made of soft black rubber. The syringe depicted in Fig. 54 is made wholly of hard rubber, with a conical nozzle especially adapted to meati with open, trumpet-like lips,



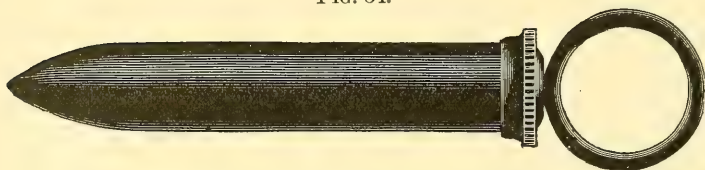
into which it will fit perfectly, and can be used without discomforting pressure or pain. Fig. 55 shows a syringe adopted to meati whose lips are closely in coaptation like the leaves of a book. Its small bulbous-ended

FIG. 53.



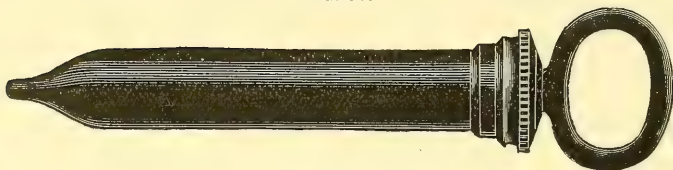
No. 83.

FIG. 54.



No. 80.

FIG. 55.

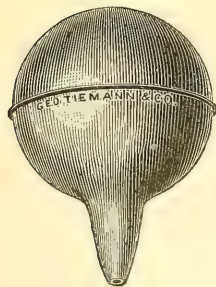


No. 96.  
Urethral syringes.

nozzle fits well into the meatus, the lips of which can be so readily pressed around it that no backward flow of the injection can occur. Another very useful injector or irrigator is a soft-rubber round bag with a conical

nozzle, holding rather more than an ounce, and called the "universal syringe." The injection should be poured into a wide-mouthed vial or a cup, from which it is drawn into the syringe. Care should be taken that air is expelled from the syringe. The patient stands with his feet about three feet apart, or he may sit on the edge of a stool, his weight resting on the coccyx. With the forefinger and thumb of the left hand the patient separates the vertical lips of the meatus, while he steadies the penis with the middle finger. The point of the syringe, held in the right hand, being in the meatus, the thumb and forefinger compress the lips together underneath the nozzle, by which manœuvre the reflux of the injection is prevented. In order that benefit

FIG. 56.



Universal syringe.

shall result, it is necessary that the fluid shall reach every portion of the mucous membrane of the anterior urethra, including the bulb, and

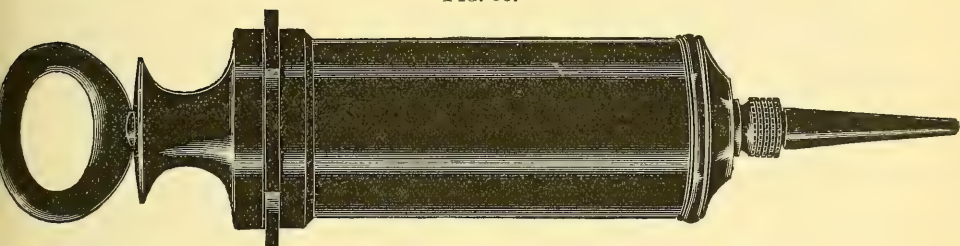
that the canal should be somewhat, but mildly, distended in the operation. It is always well for the surgeon to give minute directions as to the technique of urethral injections, and to warn patients to proceed slowly and cautiously, being careful to avoid rapid and forcible distention of the canal. It is a good rule to begin with the slow injection of about one drachm of fluid, and then to increase as the tolerance of the urethra will admit, until a syringeful can be thrown in the canal without any resistance whatever. In this way the urethra becomes accustomed to the operation, and its walls can be well acted upon by the medicated fluid. The fluid should be kept in the canal for several minutes. It may be necessary to press the injection backward by the

FIG. 57.



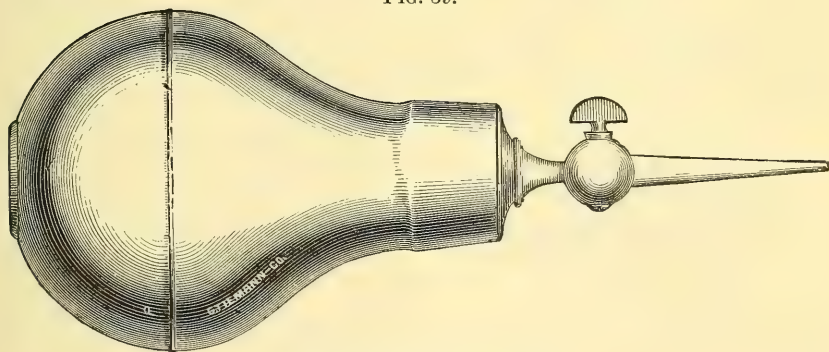
Mitchell's reflux catheter.

FIG. 58.



Ultzmann's hand-syringe.

FIG. 59.



Soft-rubber-bag injector, with stopcock.

finger-tip, passing it toward the perineum, and thus making sure of a thorough application.<sup>1</sup>

<sup>1</sup> The syringes here recommended can do no harm to the patient. Of course these injections only medicate the anterior urethra. Guiard ("De la Technique des Inject. uréthrales," *Annal. des Mal. des Org. Gén.-urin.*, 1894, p. 432 et seq.) proposes to use a syringe holding five drachms, with the view of overcoming the resistance of the compressor urethræ muscle and of throwing the injection into the posterior urethra, which is so commonly affected in anterior urethritis. There is no good to be gained by forcing the compressor, and harm may be done, particularly if the injection is administered by the patient himself. There is so much said now about overcoming the compressor and

When insoluble substances held in suspension in the injections are used, it is well for the patient to lie down in the lithotomy position, and thus give himself his injection.

In the acute stage, just as soon as we can do so without discomfort to the patient, we should order the injection of a few syringefuls of the hot solution of boric acid, borax, or of supercarbonate of soda, taking care that the injections go as far down the urethra as they can be sent, which will not be farther than the bulb. If the patient has three immersions of the penis daily, he can also have three injections, consisting of two or more syringefuls of the fluid, according to his sensations. This procedure has a markedly soothing effect upon the inflammatory state, and does much to prevent chordee and painful erections at night. When the conditions of the patient will permit, this treatment may be given once a day by the surgeon in a more radical manner. This may be attained by the administration of hot injections, consisting of from four ounces, or even a pint and over, of the medicated solution, according to the effect produced. For this purpose a soft-rubber catheter No. 12 F. or a Mitchell reflux soft-rubber catheter is employed. (See Fig. 57.) The instrument should be sparingly lubricated with glycerin, and gently and slowly pushed down as far as the bulb. The injectors suitable for large quantities of fluids are Ultzmann's hand-syringe (see Fig. 58), and the soft-rubber bag and stopcock, which holds eight ounces. (See Fig. 59.)

Ultzmann's hand-syringe<sup>1</sup> is a particularly useful instrument for urethral and bladder work. It holds five ounces, and can be made to fit into even

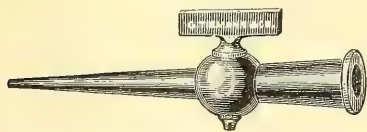
FIG. 60.



the smallest catheter by means of a hard-rubber conical coupling with and without a stopcock. (See Figs. 60 and 61.) By means of the Ultzmann instrument several ounces of the hot injection

(temp. 100° Fahr.) may be thrown slowly into the bulbous urethra and allowed to run out of the meatus. The feelings of the patient and the

FIG. 61.



progress made will be the guides as to the amount of fluid used and as to the frequency of the injections or lavages. When benefit is assuredly produced this treatment should be persevered in, But if the patient is in any way distressed or discomforted, or the inflammation is seemingly increased, it should

be stopped immediately. In very many cases, all circumstances and conditions being favorable, these irrigations will perceptibly mitigate and shorten the acute stage.

The evidence of the subsidence of the acute process is that the painful symptoms, particularly at urination, are less severe and the redness and swelling of the penis have markedly diminished. Then it will be observed

medicating the posterior urethra without a conducting tube (see method of Janet, p. 143) that it is probable that Guiard's procedure may come into fashion. It is not wise to put in the hands of patients instruments which may do them harm. It is well to let the patient inject his anterior urethra, but all applications to the posterior segment should be made only by the surgeon.

<sup>1</sup> This syringe is made in New York by the Butler Hard-rubber Co.



that the discharge is less copious, that it has lost its decidedly greenish hue, and has become grayish-white, or that the greenish hue of the pus is streaked with a white mucus. It is more gluey than it was formerly, and a drop of it being placed between the forefinger and the thumb, and these members being separated slowly, it is drawn out in minute threads, sometimes nearly an inch long, as we see molasses candy drawn out in the shop-windows. Microscopical examination then shows that the pus-cells, instead of being scattered over the field, show a tendency to become grouped together in mosaic form, being thus held by the mucin of the secretion. Then it will further be seen that comparatively few gonococci are present in the pus-cells, and none, or very few indeed, between the cells. At this time we may see those harbingers of cure—namely, round, pale, thin epithelial cells, perhaps with transition epithelium.

These indications point unerringly to a radical change of treatment and to the speedy onset of the terminal stage (all things going on auspiciously). At this time astringent and mildly-stimulating injections may be given. The patient is then prepared to help himself as far as self-administered injections will help him. The drugs generally used for urethral injections are the sulphate, acetate, sulphocarbolate, and chloride of zinc, acetate of lead, sulphate of copper, sulphate of alum and of thalline, muriate of hydrastis, and the white fluid extract of hydrastis. As a broad general rule, all of the above drugs, except the chloride of zinc and sulphate of copper, may be used in the beginning of treatment in  $\frac{1}{2}$  or 1 per cent. solutions in water. The chloride-of-zinc solution should be 1 : 2000 or 1 : 1000 to begin with, and if its use warrants its continuance it may be used of the strength of 1 : 300 or 1 : 250. It is always well to proceed cautiously with this drug. The sulphate-of-copper injection should be 1 : 500, and it may be increased to 1 : 100, but if it fails to produce good results in this strength, it is well to discard its use. No reliance can be placed on tannin. The foregoing is a quite generous armamentarium for injections, and all of them may be employed carefully in the beginning of the declining stage.

The following injections may be used, care being taken to dilute them if they produce any uneasy symptoms beyond a feeling of pleasant warmth. For the very first series of injections a solution containing one grain each of acetate of lead or of acetate of alum to the ounce of water will generally prove very acceptable. Other injections are—

R̄. Zinci sulphatis,	gr. vj ad viij ;
Liq. Magendie,	℥ij ;
Aquæ,	q. s. ad ℥iv.—M.

A combination of sulphate of zinc and acetate of lead forms a very excellent injection, as follows :

R̄. Zinci sulphat.,	
Plumbi acetat.,	āā. gr. vj ad xij ;
Ext. opii aq.,	℥ij ;
Aquæ,	℥vj.—M.

This with tincture of catechu and Sydenham's laudanum is said to be the

composition of the injection Bru, which has such favor with the laity. The efficacy of both of the foregoing injections may be increased in some cases by the addition of calamine or of subnitrate of bismuth. The latter sometimes causes burning.

R̄. Bismuth. subnit. or zinci carbon., ʒiij ;  
 Tr. catechu,  
 Vin. opii., āā. ʒij ;  
 Glycerinæ, ʒss ;  
 Aquæ, ad ʒvj.—M. To be well shaken.

The following imitation of the Bru injection was proposed by Dr. Bumstead :

R̄. Zinci sulph., āā. gr. xv ;  
 Plumbi acetat., gr. xxx ;  
 Ext. kramerizæ fl.,  
 Tr. opii, āā. ʒiij ;  
 Aquæ, ad ʒvj.—M.

It is my custom to prescribe this injection, using eight ounces of water instead of six. It is then often of much benefit.

The following injections were employed by Ricord :

R̄. Zinci sulphatis,  
 Plumbi acetatis, āā. gr. xxx ;  
 Aquæ rosæ, ʒvj.—M.

R̄. Zinci sulphatis, gr. xv ;  
 Plumbi acetatis, gr. xxx ;  
 Tr. catechu,  
 Vin. opii, āā. ʒj ;  
 Aquæ rosæ, ʒvj.—M.

Another radical change of treatment in the declining part of the acute stage is the administration of copaiba, oil of santal-wood, and cubebs, the so-called antiblennorrhagics. At this late day it is not necessary to discourse at length upon the therapeutic value of these remedies. They have stood the test of many decades, and to-day, in certain conditions, they are of much benefit in subacute and chronic gonorrhœa. When the change in the character of the discharge from pus to muco-pus occurs, then it is time to stop the alkaline mixture and to give the antiblennorrhagics. In private practice these remedies should, as a general rule, be administered in capsule form. In default of American productions (which is very singular, when we consider how far we are advanced in the art of pharmacy) we resort to French capsules. Raquin's capsules of copaiba are of especial worth, and three of them may be given as a dose, repeated three times a day. The cubebs and copaiba capsules of Mathey-Caylus are also efficient, and should be given in the same quantity as the Raquin capsules. We have so many excellent capsules of pure oil of yellow santal made in this country that we need not go abroad for foreign productions. In general terms, thirty to sixty drops of oil of santal, divided into three

doses, should be given daily, so that, when the capsules contain five drops, six to twelve may be given, or when they contain ten drops six will usually be sufficient. The dose can be pushed slightly higher, but the surgeon should always look out for the gastric effects of the oil, and should discontinue its use if severe lumbar pain, supposed to be due to renal congestion, is complained of. Cubebs, either in powder or in the form of fluid extract, in spite of its detractors has considerable anti-blennorrhagic effect when the pure, fresh drug is used. Salol some years ago was looked upon as the coming anti-blennorrhagic, but the general opinion of those who use it is that it is only feebly active or really inert. It is significant that those who recommend it always make a point of prescribing it combined with one or more of the old-time anti-blennorrhagics.

Combinations of these remedies may be used in the shape of mixtures, emulsions, and pastes, which may be made into pill or bolus form. The capsules already mentioned, being somewhat expensive, cannot be used in dispensaries and clinics. The combination known as Lafayette mixture<sup>1</sup> is a very good one, and is very largely used in nearly all medical charities. Its formula is as follows:

Ry. Bals. copaibæ,	3j ;
Liq. potassæ,	3ij ;
Ext. glycyrrhizæ,	3ss ;
Spts. æther. nitrosi,	3j ;
Syrup. acaciæ,	3vj ;
Ol. gaultheriæ,	gtt. xvj.

Mix the copaiba and liquor potassæ and the extract of liquorice and sweet spirits of nitre separately, and then add the other ingredients. The dose is from one to four teaspoonfuls three times a day.

The following is a particularly effective combination, but it is sometimes distressing to the stomach:

Ry. Bals. copaibæ,	
Ol. santal. fl.,	āā. 3ss ;
Liq. potassæ,	3vj ;
Syr. aurantii cort.,	3ij ;
Aq.,	q. s. ad 3iv.

Dose, one teaspoonful three or four times a day in a wineglass of water.

All anti-blennorrhagics should be taken at the end of stomach digestion, usually an hour and a half after eating.

The following prescription is of benefit in cases of delicate stomach:

Ry. Copaibæ bals.,	3ij ;
Magnesiæ,	3j ;
Ol. menth. piperitæ,	gtt. xx ;
Pulv. cubebæ,	
Bismuthi subnitrat.,	āā. 3ij.

<sup>1</sup> I have often been asked whether the formula of the Lafayette mixture was a favorite prescription brought over from France by its illustrious and grateful namesake. Its real origin is as follows: It was a remedy which a druggist in Greenwich street, named Ludwig, dispensed to sailors, and was in great demand. This was about the time of Lafayette's third visit to America, and his advent was honored by this mixture being named after him. Thirty or forty years ago a similar mixture was called the Washington mixture, but the patriotism of Americans frowned this name down.



M. and divide into pills of five grains each, and coat with sugar. Dose, three to six pills three times a day.

This prescription gives a good idea of the bases of cubeb and copaiba paste. There is much latitude in this direction for the exercise of pharmaceutical skill. Pastes containing cubebs, copaiba, and oil of santalwood may be of decided benefit, and they may be paraded as novelties if a few *antiseptics* are judiciously interspersed in the combination.<sup>1</sup>

Kava-kava has little antiblennorrhagic effect in the declining acute stage, but it is beneficial a little later on.

The sphere of usefulness of these antiblennorrhagics is in the declining stage of acute gonorrhœa and in those subacute suppurations of the urethra which are really relapses or exacerbations of a smouldering process.

It is important to know when to stop this form of internal treatment, since it may be pushed to the patient's disadvantage. As a rule, when the urethral discharge found in the urine consists of mucus with very little pus and more or less epithelium—in other words, when cure is in sight—it is well to cease using these stimulant remedies. There can be no question that their prolonged use really tends to keep the inflammatory state in a slumbering condition, with the discharge scant in quantity. Many men are thus over-treated, and they promptly get well when the medicine is discontinued.

The foregoing measures constitute what the patient should do for himself in the declining acute stage.

It is in this declining stage really that the most effective treatment of gonorrhœa may be used. At this time, in first infections, the subepithelial exudative inflammation is in a favorable condition to yield to proper measures. The new tissue-cells are yet young and not firmly developed, and their absorption may then be brought about. The hyperæmic and catarrhal condition of the mucous membrane is on the wane, and can be acted upon now with better effect than later on. What is now needed is an application which shall be astringent and sufficiently stimulating to cause absorption, and yet not to set up irritation. There is no known remedy which answers these requirements and indications so well as nitrate of silver.<sup>2</sup> The delicate point in its use is the determination of the strength of solutions which will do good and produce no harm. My studies on the action of nitrate of silver in gonorrhœa, acute and chronic, convince me that in very weak solutions it is an astringent of decided power. In rather stronger solutions it acts as a stimulant and an astrin-

<sup>1</sup> As a matter of history it may be well to state that gürjun balsam, Peruvian balsam, balsam of tolu, the fluid extracts of matico, stigmata maidis, of senecio Jacobæa, of Indian hemp, of *pisidia erythrina*, and of *schinus molle*, the oils of matico, eucalyptus, and *erigeron canadensis*, and turpentine, are remedies which have had in the past ephemeral popularity as antiblennorrhagics, used either alone or in combination with copaiba and cubebs. It is possible that some of these old friends may be rejuvenated later on.

<sup>2</sup> A silver preparation, named argentamine, has been used clinically and bacteriologically by Schäffer (*Wien. med. Wochenschrift*, 1894, No. 12), who considers it superior to nitrate of silver for the reason that it is not decomposed in fluids containing chloride of sodium and albumin, and that in its action it penetrates more deeply into the tissues. This preparation is colorless, of alkaline reaction, and consists of a solution of 10 parts of phosphate of silver in a solution of 10 parts of ethylenediamine ( $C_2H_4NH_{22}$ ) in 100 parts of water. In due time the worth of this drug may be determined.

Argentum natro-sulphurosum, the sulphate of sodium and silver, was used by Friedheim (*op. cit.*), and, although it does not precipitate albumin, its action is more feeble than that of the silver nitrate.

gent, and causes the absorption of the exudation into the mucous membrane. The critical point in its use is to get the astringent and absorptive effects, and this can be done by beginning with very mild solutions and increasing the strength very slowly and intelligently. When used successfully in the declining stage of gonorrhœa the evidence of benefit will be seen on examining the urine, in which pus-cells will be seen to gradually grow less in number and the epithelial cells to be more numerous and more fully developed. Used in a concentration stronger than that productive of absorption, this invaluable agent becomes a decided stimulant and a producer of suppuration. The tendency of to-day is to use this agent in too strong solutions, and it often fails in its salutary effects for this reason. In the declining stage, when the urine shows under the microscope some pus-cells and few or perhaps no gonococci and a predominance of epithelial cells, together with an excess of mucus, much can be done toward bringing the waning process to an auspicious end. This, in my judgment, is the critical period in gonorrhœa. If the patient can and will follow proper treatment at this time, he has a very good chance of being thoroughly cured. There are some cases of gonorrhœa, as of other diseases, which resist all treatment, however well directed.

At this stage the surgeon should throw into the posterior urethra (assuming that a diagnosis of the infection of that segment has been made) a very weak and warm solution of nitrate of silver, beginning with 1:20,000 or 1:16,000, using the Ultzmann's hand-syringe. The soft-rubber catheter, sparingly lubricated with glycerin, is passed down the urethra until the urine flows, which will usually occur when the instrument has got as far as seven or seven and a half inches down. The bladder being empty, pressure on the piston then throws the injection into the prostatic urethra. It is well now to withdraw the catheter a little until its end is in the membranous urethra; then on pressing the piston gently, resistance will be felt and no fluid will flow. This tells the surgeon that he is in the membranous urethra, and that the irritation of his procedure has caused the contraction of the compressor urethræ muscle. Then push the catheter inward about half an inch and inject again, when the fluid will pass readily. By this manœuvre the eye of the catheter is placed just at the apex of the prostate and at the very beginning of the prostatic urethra. The injection is then slowly thrown in, and it passes through the whole of the prostatic urethra into the bladder. If only a rather small injection is to be given, about one-half of the contents of the syringe may be used posteriorly. Then, while still pressing the piston, the surgeon gently draws out the catheter, and finds that as its eye passes through the membranous urethra the flow stops again, but is at once resumed when the eye reaches the bulbous urethra, which is then irrigated with the balance of the fluid. It may be necessary to use one syringeful for the posterior urethra and another for the anterior. The sensations of the patient and the condition of the urine are the indices for the continuance of the treatment. Usually a feeling of benefit is produced, and the patient desires another irrigation in a day or two. It is always well to proceed very cautiously. If the treatment is well borne and the urine shows a decline in the quantity of pus and mucus, and the epithelial cells show rather more development, then one is safe in going on. It is most important not to give the injections too frequently, and

this point will be determined by the sensations of the patient and the examination of the urine. Just before the final cure there will be found an excess of mucus, which floats as a cobweb-like cloud, in the meshes of which are minute little pinpoint- or pinhead-sized granules of pus and epithelium. As the morbid process ceases these little granules disappear, and then for a short time there is only a slight excess of mucus, which will, under treatment, soon be reduced to its normal quantity, and then the patient may be pronounced cured.

In very dilute solutions bichloride of mercury, 1 : 40,000–1 : 20,000, and permanganate of potassa, 1 : 10,000–4000, may, according to the fancy of the surgeon, be used in the manner just detailed in the declining stage of gonorrhœa. In like manner, very dilute solutions of alum and sulphate of zinc may be used. A large experience has taught me that the action both of the bichloride and permanganate of potassa is, as a rule subject to few exceptions, far inferior to that of nitrate of silver. The action of these two much-vaunted agents is superficial and expended on the catarrhal condition of the mucous membrane. They have very little, if any, effect in causing the absorption of the products of inflammation, so that, in my judgment, alum and zinc sulphate are far superior to them.

It is appropriate here to call particular attention to the tendency very prevalent to-day to treat gonorrhœa in the acute stage in a heedlessly heroic manner. We read of cures being produced in five, eight, twelve, and twenty days, and persons not thoroughly versed in the knowledge and treatment of gonorrhœa may be influenced by these dazzling and misleading claims. The scheme of these treatments consists in the use of some antiseptic drug (preparations of mercury, silver, permanganate of potassa, and others), either in very strong solutions or in irrigations given several times a day, very hot. These treatments, and others mentioned later, certainly cut short the severe symptoms and quite promptly cause the purulent discharge to become muco-purulent. These results are then paraded as astonishing, and cases presenting them are looked upon as having been cured. When these enthusiasts are asked in what a cure consists, they reply, "There may be some little redness of the mucous membrane left and a little sticky discharge, but the patient is all right." It is hard to understand how intelligent men can thus deceive themselves. Many patients thus treated, knowing little of gonorrhœa, consider themselves cured; others see that they are really not cured, and they disappear and their cases are registered on the books as cures. Then, again, in this sticky condition antiblennorrhagics and the usual astringents are used to complete the cure, but if they are successful the credit is given to the heroic remedy which calmed inflammation and more or less rapidly changed the character of the discharge.

In the majority of these cases, there can be no doubt, the patients are not in any sense cured. They have been rapidly pushed into the terminal stage, which in many cases has no end. Now, if we study these cases carefully (as, so unhappily, it is our frequent duty to do) in the light of the pathology of the gonorrheal process and of their pathological course, we see that the treatment has caused a much greater exudative inflammation into the submucous connective tissue than is seen in cases temperately treated, and that the catarrhal inflammation has been brought



down from suppuration to the production of a thick muco-purulent secretion. This is shown in the earlier times by the decidedly full, tense, and thickened condition of the pendulous and subpubic urethra, and by the examination of the urine, which, strange to say, is not insisted upon by the authors of these rapid-transit treatments, as they are called. Then the patients, if they have escaped epididymitis, have symptoms of posterior urethritis, urethro-cystitis, and often bladder incompetence, and more or less incontinence. They often further suffer from urine-dribbling, which is due to the infiltration into the urethral walls, which prevents the canal from performing the final expulsive acts of urination. As time goes on this exudative process, which involves nearly if not all of the anterior urethra, and perhaps the posterior part also, produces connective tissue, and as a result the canal is more and more constricted, until in some very bad cases a condition bordering on stenosis is left, accompanied by all the distressing conditions incident to the blockade of the bladder. This picture is not in one particular overdrawn, but is based on the unbiassed study of cases of acute gonorrhœa which have been railroaded into the terminal stage. It may be claimed by those who advocate this form of treatment that they never see these results. Perhaps they fail to appreciate the deplorable condition the patients are in, but, as a rule, these same patients think that they have had enough of that sort of treatment, and they have sense enough to go elsewhere. It follows, therefore, that a treatment which is at once sufficiently active, but conservative and based on a knowledge of the pathology and course of gonorrhœa, is the one which in the end will give the best results and spare the patients much trouble and suffering, and perhaps permanent infirmities.

**Irrigations, Retrojections, and Endoscopic Applications as Abortive Measures.**—A treatment of gonorrhœa known as the method of Janet<sup>1</sup> is now attracting considerable attention both in this country and abroad. This treatment is essentially based on the fact, well brought out by Feleki<sup>2</sup> (but known quite generally for many years), that as a result of a certain technique the posterior urethra and the bladder can be injected from the meatus without the aid of a catheter. It is assumed that the catheter may not only act as an irritant, but that it is a fruitful source of infection. Janet uses an irrigator or a fountain syringe, to which is attached about six feet of India-rubber tubing of 30 F. calibre. Into the distal end of this tube a goodly-sized conical glass nozzle is inserted, while an India-rubber stopcock completes the apparatus. The reservoir for the injection, whatever it may be, is elevated above the patient about two feet when the anterior urethra only is irrigated, and about four and half feet when the posterior urethra and bladder are medicated. The patient, after urination, is placed on his back and the conical nozzle is well, but not forcibly, introduced into the meatus; then the current is allowed to flow.

If irrigation of the anterior urethra is practised, the stopcock is so held that the return current may run out of the meatus. When the deeper urethra and the bladder are to be irrigated, the nozzle is firmly held in the meatus.

<sup>1</sup> "Traitement abortif de la Blennorrhagie par le Permanganate de Potasse, etc.," 3d series, *Annales de Derm. et de Syphil.*, vol. iv. pp. 1013 et seq.

<sup>2</sup> "Experimentelle Beiträge zur Funktion der Harnröhrenschliessmuskeln und zur Ausspülung der Blase ohne Katheterismus," *Internat. Centrbl. für de Physiol. und Pathol. der Harn- und Sex.-Org.*, 1890-91, vol. iii. pp. 80 et seq.

In some cases, after a little resistance, the compressor urethræ muscle and the feeble external sphincter yield, and the injection flows through the posterior urethra into the bladder. If any resistance is offered, the patient must practise the little procedure recommended by Bennett<sup>1</sup>—namely, “to strain as if to pass a very slow stream, or to strain a little.” If the operation causes a desire to urinate, the patient should be allowed to evacuate the bladder, and then the irrigation should be repeated. For the abortive treatment of acute anterior urethritis one or two irrigations daily are necessary. For gonorrhœa of the totality of the urethra, for the first few days two irrigations daily are given, and after that only one each day.

The therapeutic agent employed by Janet is permanganate of potassa dissolved in warm water. The solutions vary in strength from 1:1000 of water to 1:4000. Toward the end of treatment, with the decline of the acute symptoms, the strength may be 1:500. For the irrigation of the anterior urethra about one pint of injection may be used, while for the bladder two lavages or irrigations of about a pint each may be introduced.

By this treatment Janet claims that he not only aborts incipient gonorrhœa, but promptly cures cases in the acute purulent stage. The noticeable effects of these irrigations, as stated by Janet, are—first, the appearance of a whitish secretion, which soon becomes serous, and then an almost absolute dryness of the whole urethral canal. In unsuccessful cases after this dry stage the discharge again becomes purulent, in which case these lavages should be discontinued for eight days and then resumed. Janet says that on an average ten or eleven irrigations are sufficient to abort incipient cases, and nine for other acute cases, but in general the patient is cured by five lavages. As to the stability and validity of the cure, we find these significant words: “Sometimes there remains a slight mucous secretion;” “at other times the patient has a slight mucous discharge, in which case I gave a little irrigation of nitrate of silver, 1:2000, in the anterior urethra.” It is astonishing how complacently exploiters of abortive treatments with uniformly favorable results look upon these mucous secretions and fail to appreciate their gravity.

This treatment of Janet must, of necessity, be administered by the surgeon, to whom the patient must come once or perhaps twice a day, morning and evening. I have it from the word of mouth of gentlemen who have been thus treated that in the manipulations necessary for flushing out the anterior urethra and filling the bladder some of the injection, as a rule, escapes, and not only dampens but stains their linen. And what is the benefit? It is claimed that the urethra is spared the irritation of a catheter and the danger of infection by this instrument (which with ordinary cleanliness is *nil*). A 12 F. velvet-eyed, soft-rubber catheter can be passed into the bladder after urination, the patient standing or lying down, and that viscus can be filled by means of a hand-syringe in a short time and without any discomfort whatever. Why, therefore, should a patient be subjected to this ordeal with all its technique, its drawbacks, and its compromising stigmata? There is no benefit derived in overcoming the resistance to hydraulic pressure of the compressor urethræ. If the small-calibred soft catheter is gently pushed into the bladder, in the vast majority of cases the compressor will offer no hindrance, and

<sup>1</sup> *Journal Cutan. and Gen.-urin. Diseases*, vol. x., 1892, p. 284.

then, if the surgeon elects to use Janet's solution in the conditions before indicated, the man can at least go home with an unsoiled shirt-flap.

This method is one of the oft-recurring fads of which there seem to be no end. We have already seen that in a simple manner of application permanganate of potassa may be of benefit early in the course of gonorrhœa.

A treatment of gonorrhœa known as the hot-bichloride-retrojection method was held in high esteem by a few surgeons in New York some years ago. The method was invented by Dr. W. S. Halstead, but its most ardent advocate has been Dr. G. E. Brewer.<sup>1</sup> A tin pail is suspended from the ceiling by means of a pulley, and under it is a Bunsen burner or an alcohol lamp. To a short tin tube at the lower part of the pail a long soft-rubber tube is attached. Into this tube a short glass-tube coupling is inserted, to the distal end of which an 18 F. soft-rubber catheter is attached. The patient having urinated, the catheter is oiled and passed into the urethra about five inches or even deeper, as far as the bulb. He then is seated at the edge of a stool over a large-sized slop-jar or pail. Then about two quarts of a solution of bichloride of mercury (1 : 40,000 of water, increased in some cases to 1 : 30,000 or 1 : 20,000) are passed through the urethra. The temperature of the injection at the beginning of the séance is about that of the body, but it must be increased until the solution is as hot as the patient can bear. Two or three such treatments are to be given each day. The result is said to be a diminution of the inflammatory symptoms and a rapid transformation of the pus into a mucoid and watery secretion. If much pain is produced, the retrojection should be suspended for a few days and oil of santal-wood given internally. When the discharge has been watery for three or four days, the bichloride is suspended and sulphocarbolate-of-zinc or subnitrate-of-bismuth injections are used. In uncomplicated cases the discharge ceases in from six to twelve days.

The main objection to this treatment is that other surgeons cannot get the same results that its advocate says he gets. Personal observations, carried on in a perfectly unbiassed frame of mind, convince me that this treatment offers no advantages whatever over the older and more conservative methods, and that it is attended with marked discomfort and inconvenience to the patients, who as a result of it frequently have severe posterior urethritis, urethro-cystitis, and even epididymitis. It is now more than ten years since this treatment was introduced in New York, and it has failed utterly to obtain even a limited acceptance.

Cotes<sup>2</sup> recommends the following method of treatment of acute gonorrhœa: After urination a well-oiled warmed endoscopic tube is passed down the urethra four or five inches, the patient lying on a couch. If necessary there may be a preliminary injection of cocaine. The canal is carefully mopped and rendered free from secretion, and examined by means of electric light. Then a tuft of absorbent cotton twisted around the end of an applicator is saturated in a solution of nitrate of silver (gr. x to ʒj of water), and pushed down the tube through its distal aperture. The tube and the applicator are then withdrawn, and as a result the urethra is thoroughly moistened by the solution. A second insertion and a similar

<sup>1</sup> *A System of Genito-urin. Disease, etc.*, vol. i., 1893, pp. 161 et seq.

<sup>2</sup> *Lancet*, Feb. 27, 1892, pp. 461 et seq.



application are made to the two inches of the urethra near the meatus. A saline purgative with an alkaline or copaiba mixture is given internally, and the patient injects, using a syringe which holds only two drachms, a solution made of one drachm of Condry's fluid to a pint of water. These injections should be given six times a day, the urethra having previously been cleansed by the injection of some warm water. Cotes claims for this treatment remarkable success in amelioration of the symptoms and quick cure in from five to twelve days.

Seeing that in the great majority of cases the gonorrhœal process promptly travels back to the bulb, it seems queer that Cotes, who began treatment, as he says, in most cases many days after the disease began, was able to "head it off" at from four or five inches.

A startling novelty in the abortive treatment of incipient gonorrhœa has recently been offered by Dr. J. C. DaCosta.<sup>1</sup> The urethra having been thoroughly cleansed by urination and by the injection or spray of equal parts of water and peroxide of hydrogen (15-volume solution), the part is then sprayed by means of a metal-nozzled atomizer with a mixture of oil of cinnamon and benzoinol. This mixture should consist of one drop of the oil to the ounce of excipient for the first day's injection, two for the second, and three for the third. In 40 cases of beginning acute urethritis of from three to five days' duration, in 6 the discharge ceased in two days and did not return; in 12, in five days; in 6, from eight to ten days; in 10, from ten to fifteen days; in 10 the treatment failed; and 4 patients disappeared after their first visit. The injections or spray applications should be made three or four times a day, always into a thoroughly cleansed urethra. When pain is caused by the stronger solution, a weaker one should be used. It will be interesting to learn whether other observers can obtain like results from this method.

**Various New Agents and Methods of Treatment.**—*Iodoform.*—This agent, on account of its decided antiseptic action, has been used in the treatment of acute and declining gonorrhœa. Campana<sup>2</sup> claims good results from the following prescription: Iodoformyl alcohol, 20; carbolic acid, 0.1 to .02; glycerini, 80; and water, 20—used as an injection three times a day. He claims that this drug calms pains and cures gonorrhœa promptly when used as an injection consisting of 4 parts of iodoform to 80 of water. This should be well shaken and drawn up in a glass syringe. The patient should lie on his back, with the penis held vertically when the injection is entering; then the iodoform will be carried down the urethra.

Cheyne<sup>3</sup> claimed success from the use of bougies made of iodoform, oil of eucalyptus, and wax.

Thièry<sup>4</sup> used 10 grammes of iodoform suspended in 60 grammes of oil of sweet almonds. One or two injections of two drachms of this compound are thrown into the urethra once or twice a day after urination, and there retained for twenty minutes by compressing the lips of the meatus together. A complete cure was produced in from five to twenty-three days. He advises this method as an early abortive treatment.

<sup>1</sup> *Med. News*, Oct. 21, 1893, pp. 458 et seq.

<sup>2</sup> *La Salute, Ital. Med.*, Genoa, 1883, 2d Ser., vol. xvii. p. 33.

<sup>3</sup> *British Med. Journal*, 1880, vol. ii. p. 124.

<sup>4</sup> *Annales des Mal. de Org. Gén.-urin.*, 1891, pp. 395 et seq.

This agent has also been used in the form of wax and butter-of-cocoa bougies, and of antrophores, sometimes in combination with other antiseptics. On the whole, it is an unsatisfactory remedy for gonorrhœa.

*Resorcin.*—Letzel<sup>1</sup> first used resorcin in acute and chronic gonorrhœa in 3 to 4 per cent. watery solutions as injections. He claims marked benefit and quick cures for this drug, which to be pure must be snow-white in color, and when dissolved in pure water should make a clear solution.

Lychowski<sup>2</sup> thinks that resorcin has an antiseptic and astringent effect, quickly killing the gonococci. He used 2 to 3 per cent. solutions, and claims a cure on an average in six days.

In the decline of the acute stage I have seen cases progress favorably while using a resorcin solution, 1 drachm to 4 ounces of pure water. I have yet to see any noteworthy effects of this drug as compared with the results obtained by nitrate of silver and the zinc salts.

*Thallin.*—Kreis<sup>3</sup> put forth the claim that a 4 per cent. solution of sulphate of thallin in water killed gonococci in the process of cultivation by making the culture medium sterile. He also claimed that it was parasiticidal against the anthrax bacillus and the staphylococcus aureus.

Influenced by these results, Goll<sup>4</sup> used a 2 to 2½ per cent. solution of the sulphate of thallin in acute gonorrhœa, giving a double injection daily, the first being allowed to flow out, while the second one is retained for a few minutes. In chronic gonorrhœa he used 1 to 1½ per cent. retrojections, together with instillations of a few drops of 5 to 7 per cent. solution, and butter-of-cocoa-and-thallin pencils. He also prescribed the drug internally. Goll thinks that besides its specific effect on the gonococcus, sulphate of thallin passes into the submucous connective tissue and into the crypt-spaces and there exercises a curative effect.

Irminger<sup>5</sup> used with good results bougies containing 3½ grains of sulphate of thallin. He also gave the drug internally in 4-grain doses three times a day.

Istamanoff<sup>6</sup> claims that he found a 2 per cent. solution the best of all injections for acute and chronic gonorrhœa. He, following the lead of Nachtigael, Fenwick, and Lohnstein, used antrophores of sulphate of thallin with prompt and good results.

After repeated trials my own conclusion is that sulphate of thallin is no better than, and perhaps not as effective as, the old-time chemicals.

*Ichthyol.*—This drug was used by Jadassohn in a large number of well-observed cases in solutions of 1 to 5 per cent. in the anterior urethra and 1 to 10 per cent. in the posterior urethra. Jadassohn thinks its field of action is early in the acute stage of gonorrhœa, in which it is more effective than resorcin, weak sublimate solutions, and permanganate of

<sup>1</sup> "Zur Resorcin behandlung de Gonorrhœe," *Allg. Med. Cent. Ztg.*, No. 66, 1885.

<sup>2</sup> "Behandlung des acuten Harnsröhren-Trippers mit Resorcin," *Gazeta Lekarska*, No. 4, 1887.

<sup>3</sup> "Ueber das Verhalten der Gonococcen zur Thallinsalzen," *Corresp. Bltt. für Schweiz. Aerzte*, 1887, No. 1, pp. 9 et seq.

<sup>4</sup> "Du Traitement de la Gonorrhœe par les Sels de Thalline," *Gaz. méd. d'Algérie*, 1887, vol. xxxii. pp. 91 et seq.

<sup>5</sup> *Deut. med. Zeit.*, 1887, No. 77.

<sup>6</sup> "Ueber die Behandlung des infektiösen Urethritis mittels der Thallin-Antrophore," *Monatshfte für Prakt. Dermat.*, Dec. 15, 1888, p. 1215.

potassa.<sup>1</sup> It causes the rapid disappearance of the gonococci, and as a result the pus rapidly changes into a serous fluid. In later stages it is beneficial, and in posterior urethritis, but does not rank with nitrate of silver. Many cases are refractory to the action of this drug.

Colombini<sup>2</sup> observed that a strength of 2 and 3 per cent. ichthyol retarded the growth of the gonococcus in cultures: 1 to 2 per cent. watery solutions were well borne in acute gonorrhœa, while 8 and 9 per cent. solutions only caused a slight burning sensation. In very acute gonorrhœa a 1 per cent. solution calmed pain, diminished the number of erections, and caused the discharge to become sero-purulent, then serous. By increasing the strength to 2, 3, or 4 per cent. the discharge ceased in from ten to thirty days. In the acute stage 2 per cent. injections, whilst they change the character of the secretion, also cause an epithelial desquamation which the author thinks aids in the elimination of the gonococcus. In subacute gonorrhœa 3 to 4, and even 7 or 8, per cent. injections usually cause the discharge to disappear in fifteen days. In chronic localized gonorrhœa Colombini used solutions of strengths as high as 8, 10, and 15 per cent., with the addition of 10 per cent. of glycerin, with good results.

Ichthyol, according to this observer, possesses an undoubted anti-blennorrhagic action, and is well borne by the urethral mucous membrane, and, while he does not regard it, as Jadassohn does, as an ideal remedy, it is one of great value.

Villetti<sup>3</sup> confirms the claims of Columbini as to the soothing nature of ichthyol injections. He found that the results were favorable and prompt, and that complications were avoided. Villetti used lavages of ichthyol (1 per cent.), one each day, in cystitis, by which he means posterior urethritis and urethro-cystitis. He found they had an antiseptic, curative, and analgesic effect.

The truth is, that ichthyol is perhaps about as effective as lead-water in acute gonorrhœa, and injections made of it are objectionable to patients by reason of their staining quality and of their unpleasant odor.

*Gallobromol.*—Cazeneuve and Rollet<sup>4</sup> claim that this drug is valuable in the treatment of gonorrhœa. They used it diluted in water (1 part to 100 or 1 part to 50) as both injection and lavage. They claim that in the acute stage it calms pain, acts antiseptically, reduces inflammation, and changes the purulent secretion into muco-purulent, and may cause a cure in from six to eight days. They significantly remark that it may happen that they have to prescribe the zinc salts.

Letzel<sup>5</sup> used this remedy in 1 to 2 per cent. solution in the anterior urethra, and in 2 and sometimes 3 and 4 per cent. solutions in the posterior urethra. In some acute cases Letzel found the discharge to cease in from seven to ten days, and gonorrhœal threads no longer to appear in

<sup>1</sup> "Ueber die Behandlung der Gonorrhœe mit Ichthyol," *Deut. med. Wochenschrift*, Nos. 38 and 39, 1892.

<sup>2</sup> "Ictiolo nella cura della Blennorrhagia," *Commentario Clinico della Malattie Cutanee e Genito-urinarie*, 2d Series, 1893, fascic. 5, 6, and 7.

<sup>3</sup> *L'Ichthyol dans le Traitement des Uréthrits et des Cystites*, Rome, 1894.

<sup>4</sup> "Traitement de la Blennorrhagie par le Gallobromol," *Lyon Médical*, No. 29, July 16, 1893.

<sup>5</sup> "Gallobromol als Secretionsbeschränkendes Mittel bei Gonorrhœe und Eczema," *Ärztliche Rundschau*, No. 13, 1894.



the urine. In chronic gonorrhœa it was also very curative. Antrophores introduced into the urethra at night, together with the use of the sound, were beneficial.

Müller<sup>1</sup> tested the therapeutic value of gallobromol very carefully and reached the conclusion that it is inferior to ichthyol in calming the severe symptoms and in shortening the course of the disease. Neither ichthyol nor gallobromol, according to the opinion of this author, possess potent action against the gonococcus. Gallobromol is objectionable for the reason that it stains the patient's linen.

*Alumnol.*—Chotzen exploited this drug as non-toxic, antiseptic, and astringent, acting not only superficially, but deeply in the tissues. In his first essay Chotzen<sup>2</sup> claimed that this agent was preferable to nitrate of silver, for the reason that it does not cause pain or stain the linen. As a destroyer of the gonococcus he gives it a prominence above all other therapeutic agents. In a second essay this author<sup>3</sup> claims that in cultures alumnol promptly kills the gonococcus, and in 1 and 2 per cent. solutions it penetrates the tissues of the male urethra and of the cervix uteri, and exerts a specific action, killing the gonococci and causing the inflammatory process to wane. He makes the astonishing assertion that he cured a goodly number of cases of acute gonorrhœa in one week.

The experience of Casper<sup>4</sup> is not in accord with that of Chotzen. The former found alumnol in acute gonorrhœa no better than the old remedies, and in chronic gonorrhœa it was inferior to nitrate of silver. Samter,<sup>5</sup> together with Lewin, treated twelve cases of gonorrhœa with this remedy. They found that it does not exert a specific curative action, and their results were so unfavorable that they have renounced its use in chronic gonorrhœa.

The foregoing experiences are interesting, since they conspicuously show how the exploiter or promoter of a new drug or treatment invariably sees specific results which no one else can obtain.

*Retinol.*—Dubois<sup>6</sup> experimented with the injection of balsamics, and used retinol alone or in combination with salol 10 to 15 per cent., copaiba 5 per cent., and creoline 1 per cent. These injections are said to favorably modify the discharge.

*Pyoktanin.*—From its well-known affinities for micro-organisms it would seem that this agent might be especially useful in the treatment of gonorrhœa. Burghard<sup>7</sup> used pyoktanin in thirty cases with what does not seem a striking success. When injections (1:1000) were used, the discharge was in some cases decreased and in others increased. In all, smarting and scalding on urination were produced, together with much inflammatory reaction. When the solution was reduced in strength

<sup>1</sup> "Ueber die Einwirkung von Gallobromol auf die Acute Gonorrhœe," *Dermatologische Zeitschrift*, vol. i., 1894, pp. 516 et seq.

<sup>2</sup> "Alumnol, ein neues Mittel gegen Hautkrankheiten und Gonorrhœe," *Berl. klin. Wochenschrift*, 1892, pp. 1219 et seq.

<sup>3</sup> "Alumnol, ein Antigonorrhœicum," *Verhandl. der Deut. Derm. Gesellschaft*, 4th Congress, Wien, 1894, pp. 673 et seq.

<sup>4</sup> "Ueber die Wirkung des Alumnol auf die Gonorrhœe, etc.," *Berl. klin. Wochenschrift*, 1893, p. 306.

<sup>5</sup> "Ist das Alumnol ein specificum gegen Gonorrhœe?" *ibid.*, 1893, p. 308.

<sup>6</sup> *Thèse de Paris*, 1891.

<sup>7</sup> "On the Action of Methyl Violet, with especial reference to its use in Gonorrhœa, etc.," *Lancet*, May 23, 1891, p. 1147.

(1:3000) it worked better. Burghard recommends this solution, 1:3000, to begin with, and then to cautiously increase the strength.

Lindstroem<sup>1</sup> is disposed to think that this agent is valuable in acute gonorrhœa when a strength of solution of 1:4000 or 1:2000 is used. The very decided staining quality of this drug will prevent its extended use, even if found beneficial in very dilute solutions.

*Antipyrine*.—This drug, useful in many cases of painful complications and symptoms of gonorrhœa, has been used by some authors as an ingredient for injections.

Audhoui,<sup>2</sup> in several cases of acute and chronic gonorrhœa, claims success from the use of injections of the strength of  $2\frac{1}{2}$  per cent., dissolved in water. Brindisi<sup>3</sup> is said to have used the same solution with benefit.

The paucity of its literature and the absence of the claim of specific action for this drug go to show that it has little if any therapeutic effect.

*Citric Acid*.—As a result of the knowledge of the energetic action of citric acid on the bacillus of diphtheria, Pélissier<sup>4</sup> has used this drug in acute gonorrhœa in fifteen cases, effecting a cure in from fifteen to eighteen days. He uses a solution (1:100 of water) as an injection six times daily. For lavages the solution employed is 8 grammes of citric acid to 1000 grammes of water.

*Dermatol*, suspended in a thick mucilage made of Irish and Iceland mosses, was claimed by Vaughan<sup>5</sup> to act as a demulcent and to promptly cure acute gonorrhœa. This is one of the passing fancies in the treatment of gonorrhœa which appears and disappears with equal celerity.

*Sozoidol of zinc* has been used with benefit by Taaks<sup>6</sup> in 2 or 3 per cent. watery solutions as injections in acute gonorrhœa in men and women. Friedheim<sup>7</sup> used this salt, as well as sozoidol of potassium and sodium, and claims that it distinctly lessens the purulency of the discharge.

*Lysol*<sup>8</sup> in 1 per cent. watery solution has been used by Carballo with the usual great success peculiar to new remedies.

*Creoline* is regarded by La Rosa<sup>9</sup> as superior to corrosive sublimate and carbolic acid when used as an injection (1:100 of water).

*Salicylate of Mercury*.—Schwimmer<sup>10</sup> recommends injections of salicylate of mercury in acute gonorrhœa, using a watery solution of 1 centigramme to 100 grammes of water, as an injection three times a day. This is said to cause the discharge to cease in a few days. This remedy proved efficient in Friedheim's hands.<sup>11</sup>

*Salicylate of cadmium* is considered by Cesaris<sup>12</sup> an energetic antiseptic and astringent, useful in gonorrhœa as an injection (5ss to water 3viss).

*Quinine* has been used by several surgeons, suspended in water as an injection in gonorrhœa, and some claim good results from its use.

<sup>1</sup> *Wratch*, No. 37, 1890.

<sup>3</sup> *Med. News*, April 25, 1891.

<sup>5</sup> *New York Med. Journ.*, April 30, 1892.

<sup>7</sup> *Op. cit.*

<sup>8</sup> *Monatshefte für Prak. Derm.*, vol. xvi., 1893, p. 492, and *Boletin de Medicina de Chile*, 1892.

<sup>9</sup> *Giornale Ital. delle Malat. Ven. e della Pelle*, 1890, p. 194.

<sup>10</sup> *Wien. med. Wochenschrift*, No. 8, 1889, p. 281.

<sup>12</sup> *Bolletino Chim.-farm.*, 1894, p. 407, quoted from *Merk's Annual Report* for 1894, Darmstadt, 1895.

<sup>2</sup> *Gazette des Hôpitaux*, Sept. 29, 1888.

<sup>4</sup> *Bull. de Thérapeutique*, Dec. 15, 1894.

<sup>6</sup> *Inaug. Dissert.*, Wurtzburg, 1889.

<sup>11</sup> *Op. cit.*

Harmonic<sup>1</sup> regards the drug as a mild antiseptic and of benefit in acute gonorrhœa. He used an injection composed of subnitrate of bismuth 5 grammes, quinine 1 gramme, and water 130 grammes. The average strength of these injections should be 1 or 2 per cent.

Ledetsch<sup>2</sup> used quinine in solution, 1 : 100, with brilliant results. In some chronic cases of gonorrhœa the author was astonished at the rapidity of cure, which resulted in a few days. A slight burning sensation is produced.

*Naphthol* has been found to have only very slight antiparasitic action upon the gonococcus by Critzman.<sup>3</sup>

*Ergotine* comes in for a fair share of praise in the treatment of acute gonorrhœa by Roicki.<sup>4</sup> The injection used consists of 30 centigrammes of ergotine to 300 grammes of distilled water. The patient should also take internally two to four pills of this drug, containing two grains each, daily.

*Tannin* has been extensively used in gonorrhœa in injection form, but its therapeutic action is very limited, and it sometimes is very irritating.

*Sea-water* is said to have cured thirty-two cases of gonorrhœa when injected into the urethra eight times daily. O'Brien,<sup>5</sup> who is the sponsor for this treatment, claims cures in about eight days. The efficacy of the water is said to be due to its alkalinity and to its antiseptic and tonic properties, all of which are enhanced if it is slightly heated.

*Pyridin*, or tricarboxylic acid, has been used with prompt and good effect in gonorrhœa by Rademacher<sup>6</sup> in a watery solution,  $\frac{1}{2}$  a grain to the ounce, as an injection used three or four times a day.

*Silico-fluoride of sodium* is considered by Croskey<sup>7</sup> to be a valuable antiseptic agent and very effective in gonorrhœa in a 1 : 1000 solution in water. Four injections daily should be used.

*Pyrogallie acid*, in 4 per cent. solution, was used by Friedheim<sup>8</sup> with slow effect, the drug being sometimes irritating even when used in 2 per cent. solution.

*Sodium chloroborosum* was used in acute gonorrhœa by Friedheim<sup>9</sup> in 5 per cent. solution, with alleged good effect and no irritation.

*Carbonic-acid water* has been exploited as an active injection in acute gonorrhœa, when used in a cold state. It sometimes causes much irritation.

*Thermal sulphur waters* have been regarded as curative when injected in acute gonorrhœa, particularly by the disinterested physicians who live at the springs.

As examples of the fatuous methods of treatment recommended for gonorrhœa the inhalation of ethereal oils and turpentine-vapor baths may be mentioned as some of the most conspicuous.

**Bougies, Antrophores, Ointments, Sounds, Syringes, and Insufflators.**—Of late years many authors have written in praise of certain applications

<sup>1</sup> *Annales Medico-chirurgicales et Thérapeutiques*, July, pp. 219 et seq., 1886.

<sup>2</sup> *Prager med. Wochenschrift*, No. 32, 1887, p. 275.

<sup>3</sup> *Annales des Mal. des Org. Gén.-urin.*, vol. vii., 1889, p. 244.

<sup>4</sup> *Ibid.*, 1891, p. 725.

<sup>5</sup> *British Med. Journ.*, Nov. 30, 1889, p. 1215.

<sup>6</sup> *Medical Herald* (Louisville), Oct., 1887, p. 290.

<sup>7</sup> *Med. Times and Register*, July 6, 1889.

<sup>8</sup> *Op. cit.*

<sup>9</sup> *Op. cit.*



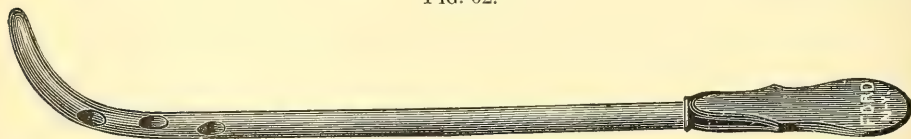
to the anterior urethra, as far back as the bulb, used in the form of bougies, antrophores, and ointments. These agents perhaps may be useful in the chronic stage in some cases.

*Bougies* have as their base lanolin, vaseline, and cocoa-butter, rendered comparatively hard and stiff by the admixture of a certain amount of white wax. A large number of drugs and combinations of drugs of an astringent and antiseptic nature have been incorporated with these basic substances, according to the fancy of the inventor of a "new treatment." These bougies, as a rule, have a calibre of about 14 French, and they may be of any length, but usually those of two or three inches are recommended. The following are the principal drugs used in bougieform in chronic anterior urethritis: nitrate of silver, sulphate and sulphocarbolate of zinc, subnitrate of bismuth, thallin, quinine, iodoform, oil of eucalyptus, corrosive sublimate, calomel, ichthyol, boric acid, and alum. These bougies may be introduced into the urethra once a day by means of an endoscopic tube; the end of the penis is then enveloped in a tuft of absorbent cotton held in place by an India-rubber elastic band. In Germany, Senftleben's<sup>1</sup> urethral pistol seems to be in much favor. This instrument consists of a cannula made of celluloid, into which an obturating staff of whalebone is inserted.

*Antrophores* are soluble bougies composed of medicated gelatin moulded on a spiral wire. Into the gelatinous mass any one or several of the above-mentioned drugs may be incorporated as it may suit the fancy of the surgeon. As time goes on and as new antiseptic drugs are invented or discovered, we shall no doubt have new treatments in the shape of bougies or antrophores.

*Ointments* have for their bases lanolin, vaseline, cerate, and cocoa-butter, and are less firm in structure than bougies. The therapeutic agents have already been named. These ointments for the urethra are introduced into that canal by means of sounds and syringes. In America we have used for years, and sometimes with benefit (when nitrate of silver, 3ss to ʒj, was the active agent), what is known as the cupped sound. At

FIG. 62.



Cupped sound.

its distal portion there are six or eight cup-shaped depressions, into which the ointment is placed before the sound is passed. This treatment of chronic gonorrhœa by means of ointment introduced upon sounds into the urethra has been advocated quite warmly in Germany. Unna<sup>2</sup> advises a quite stiff ointment, the essential part of which is nitrate of silver. This is liquefied in a lukewarm-water bath, and the sounds, of which he has invented a complete set, are dipped in it and then hung up to cool. Then they are introduced into the urethra, the warmth of which causes the oint-

<sup>1</sup> "Eine neue Methode der Tripper Behandlung," *Monatshefte für Prak. Dermat.*, 1884, vol. iii. pp. 281 et seq.

<sup>2</sup> *Ibid.*, vol. iii., 1884, pp. 326 et seq.

ment to melt and lubricate the parts. Szadek<sup>1</sup> advocates Unna's treatment in an article showing its scope and limitations.

Casper<sup>2</sup> has modified the cup-sound, and uses cylindrical steel sounds with four to six quite deep, narrow grooves about three inches long, which begin about an inch and a quarter from the tip, passing around the curve as far as the straight portion of the instrument. With Unna's instrument the ointment rarely comes in contact with all the mucous membrane traversed by the sound. With the cupped sound and Casper's sound, if care is taken to wipe off the instrument smoothly after the ointment has been deposited upon it, a quite sharply-localized application of the remedy on the urethral walls may be attained.

In this ointment-sound treatment there is a combination of pressure and dilatation, with a decided astringent action. Cases must be carefully selected upon which to employ this treatment, which of necessity causes more or less inflammatory reaction. When there is much hyperæmia with thickening, or where the morbid process is quite extensive, the treatment will in all probability produce harm. When the cell-infiltration is considerable and the condensation of the mucous membrane well marked, and there is not much hyperæmia—in short, in certain sluggish cases—this treatment may be of decided benefit. It should only be adopted after a full study of the case, and it should be followed out with great care and watchfulness.

Within recent years great activity has been displayed in the invention of syringes for the deposition of ointments in the urethra as far down as the bulb. Most authors who introduce new ointment-syringes and treatment speak of their methods as being the rational one, the inference being warranted that they regard other methods as irrational. In order that an idea may be conveyed as to what we have already on hand in this direction, I will give the chief literature on this subject, which may have the good effect of sparing us any further additions. All ointment-syringes are modifications of silver catheters, uterine syringes, rectal syringes, and the ordinary penis-syringe. The simple fact is, that the ordinary uterine syringe, with its long tube, will do all that is needed of it in this treatment, particularly if the tube be bent like a steel sound.

Tommasoli<sup>3</sup> has recently described a syringe which is a combination of the penis-syringe, at the end of which is a catheter with the opening on its end. This author had already invented a syringe, and had further modified it several years before. The next inventor was C. J. Smith,<sup>4</sup> who has favored us with a modification of a rectal syringe, and he was followed by Bransford Lewis,<sup>5</sup> who attached vulcanized soft-rubber stems to the ointment-box in order to produce a minimum of irritation.

On old fad is now being revived in the shape of certain complicated insufflators or powder-blowers. Rosenburg<sup>6</sup> described a complex instrument, called the "urethral exsiccator," by which he throws into the urethra

<sup>1</sup> *Archiv für Derm. und Syphilis*, 1889, vol. xix. pp. 171 et seq.

<sup>2</sup> *Berl. klin. Wochenschrift*, 1885, No. 49, p. 806.

<sup>3</sup> *Giornale Ital. delle Malat. Ven. e della Pelle*, 1891, p. 255; also same journal, 1887, p. 270, and 1889, p. 283.

<sup>4</sup> *Lancet*, Sept. 1, 1888, p. 418.

<sup>5</sup> *The Medical Standard*, Nov., 1889, pp. 143 et seq.

<sup>6</sup> *Die Behandlung der Gonorrhöe nach neuen Grundsätzen*, Berlin, 1895 (brochure).

a powder called by him "zymöidin," which is composed of no less than seventeen drugs having an astringent and antiseptic action.

Still another insufflator, rather less complicated in structure, is exploited by Schalenkamp,<sup>1</sup> who gives minute directions for the deposit by it of antiseptic powders in the urethra.

Future inventors should familiarize themselves with the mechanism of these instruments, lest they find themselves forestalled in some particular feature.

**Separation of the Urethral Walls and Drainage.**—A number of writers have advocated methods of treatment of gonorrhœa the essential feature of which is to interpose some substance or instrument in the urethra, and thus keep its walls apart. Since it is just as important that the young practitioner should know what not to do in the treatment of gonorrhœa as it is for him to know what should be done, I will give an outline of these procedures, which may have some influence in deterring others from experiments in this direction.

Pitts<sup>2</sup> recommends a method of treatment at once unique and radical. In order to "jugulate gonorrhœa in its incipency" he first causes the patient to urinate, then washes out the urethra with warm boiled water, and cocainizes it if sensitive. If the meatus is small, it must be cut to the full size of the urethra to allow a metallic tube to be passed five inches. Through this tube a cotton tampon, saturated in a 1:20,000 bichloride solution, is passed well down the urethra. This tampon is tied to a silk thread. Then the urethra is again injected through the tube, and another tampon with silk thread is introduced. Thus he keeps on until the urethra is filled up. The strings hang from the urethra, and by means of them the tampons can be removed. The tampons should be kept in the urethra as long as they can be borne, and they should be renewed every seven days. In 11 cases a cure resulted, on an average, in twenty-five days, without sequelæ. Nothing is said about the interference with urination thus induced, nor as to the amount of discomfort suffered by the patient. Any one who has seen in practising endoscopy of the urethra how spasmodically that canal will contract on the cotton at the end of the applicator on some occasions, will have convinced himself that tamponing of the urethral canal is impracticable, by reason of the spasmodic condition which will follow.

McVail<sup>3</sup> recommends an open wire arrangement which is to be constantly worn by the patient, "so that the discharge may drain freely away." His wire bougies are an inch and a half long, but he says that they may of necessity have to be much longer. We have already seen that in no case of acute gonorrhœa is the morbid process limited to the first inch and a half of the urethra longer than a day or two; hence these short bougies would fail of their purpose even if the urethra were sufficiently quiescent to allow their presence. To drain the deeper and bulbous portion of the canal with these bougies is a simple impossibility, since they would become so bent at the peno-scrotal angle that they would fail in aiding drainage.

<sup>1</sup> "Die Insufflation trockener Pulver, etc.," *Monatshefte für Prak. Dermat.*, vol. xx., 1895, pp. 279 et seq.

<sup>2</sup> *Med. News*, Sept. 27, 1893.

<sup>3</sup> *British Med. Journal*, March 15, 1884, pp. 306 et seq.



The principle of urethral drainage is carried to an extreme in an article by B. Foster.<sup>1</sup> This author suggests that when the diagnosis of a first gonorrhœa is made the patient should be etherized, properly prepared, and a button-hole opening made in the perineum and bladder drainage established. Then the anterior urethra should be thoroughly irrigated with appropriate solutions.

If we could obtain the consent of the majority of gonorrhœics to this radical treatment, we should have to enlarge our hospital facilities to an extreme degree.

The distention of the urethral walls and their separation by means of a mild powder with antiseptic properties are the essential factors in a mode of treatment advocated by Pixley and Zeisler.<sup>2</sup> They use a rather complicated instrument, which is really a long metallic endoscopic tube with an obturator and a hollow spiral made of wire. After urination the canal is flushed with a permanganate solution (1 : 10,000), then dried by stripping the urethra. Then the tube is introduced, the patient being on his back; the obturator is withdrawn, the powder is put in the expanded part of the instrument, and the spiral is then introduced and twisted, thus carrying the powder into the urethra. Boric acid may be used, also a powder composed of calomel 1 part, subcarbonate of bismuth 10 parts, and boric acid 12 parts. I gave this treatment a fair trial, and found it, even when employed with the utmost care, discomforting and even painful to the patient, and productive of no good whatever.

In the same line with the preceding is the following method: About twenty years ago injections of water mixed as thickly as possible with clay-earth were much vaunted by Gordon<sup>3</sup> and Hewson as an abortive treatment of gonorrhœa. The effect thus produced was the deposit of an inert substance in the urethra which kept the walls apart. Since no one but its promoters could obtain beneficial results from this dirty treatment, it has remained unemployed all these years, and it is to be hoped that it will not be reintroduced.

<sup>1</sup> "The Ideal Treatment of Acute Gonorrhœa. Is it Justifiable?" *Journal of Cutan. and Gen.-urin. Diseases.*, Sept., 1894, pp. 390 et seq.

<sup>2</sup> *Medical Record*, Jan. 19, 1889, pp. 64 et seq.

<sup>3</sup> *Am. Journal of Syphilog. and Dermat., etc.*, Oct., 1874, p. 337.

## CHAPTER XI.

## ACUTE POSTERIOR URETHRITIS, OR GONORRHOEA.

It is now a well-established fact, as we have seen in a previous chapter, that anterior urethritis in between 80 and 90 per cent. of cases within the early days of the infection passes backward and involves the posterior urethra. When the disease reaches the bulb of the urethra, which it does within a few days in acute attacks, there is then an acute inflammation and profuse suppuration in highly vascular tissues. The thesis is then no longer tenable that such is the tonus or the markedly-contracted condition of the compressor urethræ muscle that the lumen of the urethra is hair-like in calibre, and that the parts are, as we may say, so exsanguinated that the extension of the infective process is thus prevented or barred. Such is not the case. The bulb in gonorrhœal inflammation becomes a profusely suppurating pouch, and from it, in the majority of cases, the morbid process, by cell-to-cell invasion, attacks the membranous and prostatic urethra.

In many cases the onset of posterior urethritis is unattended by any marked symptoms, and it is largely by reason of this absence of symptoms pointing to the deep extension of the trouble that the opinion was held that the posterior urethra is invaded only in a minority of cases.

It has been customary to speak of a deep burning pain between the testes and in the perineum as symptomatic of involvement of the bulbous urethra—a contention which is quite correct. But it is equally certain that this symptom occurs when the infective process has invaded the urethra beyond the triangular ligament. Its import has, therefore, frequently been misconstrued. Acute posterior urethritis, moreover, may exist and gradually decline in the manner and with the same symptomatology that we have seen the infection of the anterior urethra subside. In such cases there has been no suspicion of the invasion of the canal beyond the bulb, and in all probability the two-glass test and the lavage of the anterior urethra, followed by the one- or two-glass test, have not been resorted to. Thus it is that many instances of involvement of the posterior urethra have been unrecognized.

If cases of acute gonorrhœa are carefully watched as to their symptomatology, and the urine is properly examined, it will be found that in a goodly proportion the only symptoms of posterior urethritis will be a slight burning deep in the canal, particularly after urinating, and a very slight increase in the number of urinations. In many cases these symptoms will only come to light as a result of the care and acumen of the physician, since many patients say nothing about them or fail to take much notice of them.

Then there are other patients who, when the discharge is profuse, will complain of the deep-seated burning pain and of an increased desire to make water. Many of these cases are able to go about and attend to their duties during the acute and declining stages of their trouble, which is gonorrhœa of the totality of the urethra.

But the symptoms most strikingly indicative of invasion of the posterior urethra are a diminution in the amount of the suppuration or its entire cessation (even when it is profuse and also when it is on the decline) and a decidedly increased desire to urinate. In some cases the cessation of the discharge so pleases the patient that he gives himself little concern about the increased frequency of urination. In these cases by the two-glass test the first and second specimens of urine will be found to be opaque and to contain pus and tissue-elements. If no complications develop in such cases, the trouble in the posterior urethra may be more or less severe for a time; then in most instances the discharge again appears, either copious or rather scanty, at the meatus; the patient feels much relieved, and the case then behaves like one of anterior urethritis on the decline.

In many cases in which a supposed anterior urethritis is declining in a satisfactory manner the patient will present himself and complain of a frequent and intense desire to urinate, together with pain deep down in the perineum at the end of micturition. By questioning the patient the mode of onset of his trouble will be made clear. He usually begins by urinating in a normal manner, but at the end of the act he experiences a dull pain and weight in the perineum or a short, sharp spasm. This leads him to think that he has not evacuated the bladder, and he then strains, but expels no urine, or at most only a few drops, the passage of which causes still more deeply-seated pain. Thus ushered in, the tenesmus begins in varying degrees of severity. Examination of the urine shows cloudiness in both beakers when the suppuration is profuse, as it usually is in such cases. This desire to urinate may be very frequent and imperative, or the symptoms may be less pronounced. In some cases a patient may go about, while in others he is forced to go to bed. In severe cases a further symptom is added to the patient's discomfort, and this is a more or less profuse hæmaturia. In most cases the blood follows the urine, but in some it appears before it is all voided. There may be but a few drops or the quantity may be very profuse, in which case Guyon's simile is warranted, in which he says the patient has nose-bleed from the meatus. In some of these cases of hæmaturia in posterior urethritis a small worm-like mass of coagulated blood may be passed in the first jet of urine. This coagulation is formed in the intervals of urination by the escape of blood from the inflamed prostatic urethra. At the end of micturition the prostate and bladder sphincters contract and squeeze the inflamed and eroded lining membrane, thus forcing the blood from it, as we by squeezing force water from a sponge.

Strange as it may seem, even in very severe and acute cases there is no systemic reaction, there is no fever, and there is no increase in the frequency of the pulse.

There are, therefore, four well-marked symptoms and conditions of posterior urethritis, as follows:

1. Frequent and intense desire to urinate;
2. Pain in glans penis and perineum at the end of urination;
3. Hæmaturia (sometimes absent);
4. Absence of systemic symptoms.

In addition to the foregoing classical symptoms, there are two to which attention was directed by Leprévost,<sup>1</sup> which are complete retention and

<sup>1</sup> *Étude sur les Cystites blennorrhagiques*, Paris, 1884, pp. 34 et seq.



incontinence of urine. Temporary retention may occur in the less severe order of cases, due to spasm of the compressor urethræ muscle, and may pass away without the surgeon having to resort to the catheter. Complete retention, due to the same cause, may occur in severe cases in which there is urethral stricture, hypertrophy, or abscess of the prostate. In these cases prompt surgical relief is sometimes imperative.

By the term "relative incontinence" is understood a relaxed or insufficient condition of the compressor urethræ muscle, which fails, even when will-power is exercised, to keep back the urinary stream. This condition is observed in the more severe order of cases. A sudden impulse to urinate overtakes the patient, the bladder contracts, and some urine is expelled, perhaps in the patient's pantaloons. Hearing a stream of water flowing from a faucet or a hydrant or from a watering-cart, washing the hands, and even the flow of lager beer from the tap, sometimes causes in these patients vesical contraction and the escape of urine, the compressor urethræ being enfeebled and offering little or no resistance.

Guyon and Jamin have laid stress upon the intermittent expulsion of pus from the posterior into the anterior urethra when the suppuration is profuse in the former. Without any erotic sensation the patient imagines that he has had a seminal emission, and he finds a purulent secretion flowing from the meatus. Guiard,<sup>1</sup> who has paid particular attention to this point by minutely questioning all of his patients as to whether they have experienced such excitations, thinks that they are very rare—a view with which my own experience is in accord.

In many acute cases we also observe such symptoms as painless erections and pollutions. Pollutions are very significant of the involvement of the posterior urethra, since they are due to the irritation of the inflammatory process in the caput gallinaginis. Chordee is not observed, unless the inflammation still remains in the acute stage in the anterior urethra.

In the general run of cases the increased desire to urinate only causes discomfort, and not much pain. Such patients generally go about and rest when they can. In other cases the patients' sufferings may be said to be quite severe. Then, again, we sometimes see patients thus afflicted who become objects of the most profound sympathy. While in some patients the desire to urinate may occur every hour or so, in others it occurs every half hour or less. Then in very bad cases the imperious desire comes every five minutes, and in yet worse cases there is no interval: the patient sits over the chamber the whole time, groaning and crying out with pain and drenched in a cold sweat, passing a few drops at a time of bloody urine. The pain is usually of a dull character, and felt at the end of the act of urination. Some patients complain of pain at the end of the penis before urination, as they do with stone in the bladder. This pain and tenesmus in severe cases radiates to the bladder, anus, lumbar region, spermatic cord, and the hypogastrium. Sometimes these patients also suffer from cramps in the legs. In many cases nocturnal exacerbations are observed. In these very bad cases of acute posterior urethritis the urine in the second glass is more cloudy than that in the first. These patients seem instinctively to know that they suffer less when they pass considerable urine; hence they drink large quantities of water in order to dilute the urine and to render it less irritating.

<sup>1</sup> *La Blennorrhagie chez l'Homme*, Paris, 1894, p. 251.

When the hemorrhage is very severe it escapes in the intervals of urination from the posterior urethra into the bladder, and then the first, and particularly the second, glass will be found to contain blood as well as pus. In such cases there is usually the same terminal flow of blood after urination as has already been described.

Albuminuria<sup>1</sup> is a symptom peculiar to severe cases of posterior urethritis. It is severe in proportion to the intensity of the tenesmus, and is said to be caused by the spasmodic contraction of the orifices of the ureters by the detrusor muscles of the bladder, which dams back the urine and leads to the escape of albumin from the glomeruli into the renal tubules.

It will be seen that in inflammation of the posterior urethra the symptoms may be slight and insignificant, and they may be severe, and even violent and atrocious. The duration of an attack of posterior urethritis is very uncertain. In the milder forms it may last weeks and months, according to the care taken and treatment advised. In moderately severe cases one or more weeks, even as many as six, may elapse before a condition of comfort is established, even when the treatment is correct and the care of the patient perfect. In the most severe cases the duration is indefinite. Usually such a violent attack lasts two or more weeks, and then amelioration occurs and the disease becomes less severe.

When posterior urethritis complicates the condition incident to hypertrophy of the prostate, or when middle-aged or old men, having stricture of the urethra, are attacked with posterior urethritis, their condition is very often alarming and even critical. In such cases the symptoms are very severe and the sufferings of the patients very intense. This combination of acute and chronic disorder is the more dangerous as it may lead to rapidly-ascending gonorrhœa and an invasion of the kidneys.

The first symptom pointing to improvement is the less urgent desire to make water and the greater length of the intervals of urination. Then the local and radiating pains become less, and the patient becomes more comfortable and hopeful. The progress toward recovery in very severe cases is usually slow and may be interrupted by relapses, which are often brought on by indiscretions of the patient in the matter of alcoholic excesses, sexual imprudences, and bodily strains. In many cases the disease ceases to give the patient concern and settles down into a chronic condition, in which there may be no subjective symptoms whatever. In these cases the discharge is small in quantity and viscid in consistency, and the two-glass test fails to localize the inflammatory process. Resort to lavage of the anterior urethra, however, will show that the posterior urethra is the seat of chronic inflammation.

In very acute cases of posterior urethritis the secretion is purulent and profuse, like that of anterior urethritis, and in it the gonococcus can usually be readily discovered. As the process grows older the pus becomes mixed with epithelial cells and is seen in the form of threads. It is very

<sup>1</sup> In spite of many contributions on the subject our knowledge of the pathology of albuminuria in the course of gonorrhœa is yet very limited and unsatisfactory. Balzer and Souplet in a recent communication reach the conclusion that it is due to general systemic infection. The reader is referred to the following essays by these authors: "Note sur l'Albuminurie liée à la Blennorrhagie," *Bulletin de la Société française de Dermatologie et de Syphiligraphie*, vol. ii., 1891, pp. 235 et seq.; and "Nouvelle Contribution à l'Étude de l'Albuminurie compliquant les Phases aiguës de la Blennorrhagie," *Annales de Derm. et de Syphiligraphie*, 1891, pp. 113 et seq.

difficult to find this micro-organism by means of the microscope late in the course of posterior urethritis.

Invasion of the posterior urethra menaces the following parts: the verumontanum, the ejaculatory ducts, the ducts of the seminal vesicles, the prostatic ducts, the epididymis and testes, the seminal vesicles, and the bladder. Posterior urethritis, therefore, may be the starting-point of various complications, all of which are painful and distressing, and some of them are more or less dangerous in their results.

**Diagnosis.**—Commonly, the diagnosis of acute anterior gonorrhœa or urethritis is usually made by the patient before the physician is consulted. In some instances, however, a correct conclusion is not reached at the first consultation. Some cases of balanitis, in which the prepuce is rather tight, resemble gonorrhœa, for the reason that besides the discharge the meatus may be red and swollen, and perhaps there is slight uneasiness in urination. Retraction of the foreskin and cleansing of the parts will permit a thorough examination, and then the diagnosis can be readily made. In those cases of balanitis in which the preputial orifice is very small, even of pinhole size, more difficulty may be experienced. By means of intrapreputial injections the discharge may be removed; the parts then being dried, slight pressure upon the urethra from behind forward will reveal the presence or absence of pus in the canal. By means of the microscope we can find gonococci in the pus of gonorrhœa, and it is not found in that of balanitis.

When the initial lesion of syphilis is developed on or within the lips of the meatus, a slight mucous discharge is present, and doubt as to its nature may exist up to the period when the diagnosis of chancre is made. The initial lesion may occur at one or more inches down the canal, and give rise to a discharge which is usually sero-purulent and scanty. Such patients complain of a localized uneasiness and impediment to urination, and examination reveals a circumscribed thickening of the corpus spongiosum. In these cases the endoscope and the microscope afford much aid.

Gummatous infiltration occurs at any part of the pendulous urethra, and a scanty sero-purulent discharge accompanies its development. The absence of inflammatory symptoms, the localization of the lesion, and the history of the patient are usually sufficient for a correct if perhaps rather delayed diagnosis.

The mucous fluid which exudes from the meatus when the seat of herpes progenitalis and the presence of vesicles establish the case as not one of gonorrhœa.

The pus of chancroids of the meatus is of a rusty-brown color, differing markedly from that of gonorrhœa. The points in the diagnosis of posterior urethritis have necessarily been given in the description of that condition.

The diagnosis of acute posterior urethritis, it may be mentioned, is made by a consideration of the acute attack in the anterior urethra and the typical symptoms of deeper invasion.

**Prognosis.**—In general, the prognosis of gonorrhœa is good, and a cure may be promised in from three to six or eight weeks if proper care and treatment are used. The disease is commonly very obstinate when acquired before puberty, particularly in scrofulous and tuberculous sub-



jects. In plethoric persons, in high livers, and those addicted to drink, in rheumatic and gouty subjects, gonorrhœa is frequently very persistent. In those who are overworked, the subjects of mental worry, and those of neuropathic tendency the disease is often very tedious. Even in healthy subjects, in many cases, the inflammatory process is very rebellious, and shows a tendency to become localized in some part of the urethra, and there tax the bearer's patience and the surgeon's skill. By reason of its chronicity and its complications and sequelæ gonorrhœa may become a serious, dangerous, and even lethal affection; therefore its seriousness should not be underestimated.

**Treatment of Acute Posterior Urethritis.**—In many cases, where the totality of the urethra is involved, the treatment of the posterior segment requires nothing more than the regular treatment for acute anterior urethritis, which has already been described.

In the milder forms of acute posterior urethritis it is well to stop the use of antiblennorrhagics and the employment of injections into the anterior urethra if they give evidence of producing irritation.

At first, in the severe class of cases, no local treatment should be used. The patient should be put to bed and placed on a milk diet, and he should take the alkaline and hyoscyamus mixture. His bowels should be kept loose by the use of mild cathartics. In many mild and in some severe cases the following mixture will produce much comfort.

R̄	Fl. ext. tritici repent,	
	Fl. ext. uvæ-ursi,	āā. ʒiiss;
	Liq. potassæ,	ʒss;
	Tr. opii,	gtt. lxxiv to xcvi;
	Aquæ,	ad ʒiv.

Dose, one teaspoonful every three or four hours in a wine-glass of water. It is well, in the milder order of cases, to give laudanum in small doses without producing any heaviness and sleepiness, since it calms and soothes the patient and improves his *morale*, which is sometimes much disturbed by the frequency of urination, tenesmus, and hæmaturia. In the very severe cases hot sitz-baths, hot-water bags to the perineum and perhaps over the pubis, together with tolerably strong suppositories of morphine and belladonna, may be used according to the indications. In many cases warm enemata to clear the rectum, followed by an injection of cold water, will be very beneficial. It is a good rule to see that the bowels are rendered free once a day. Patients usually like large quantities of water; therefore Apollinaris, Stafford, Poland, and other waters which have a mildly demulcent effect may be freely allowed. In these cases a moderate amount of alkali is usually beneficial, but too much should not be given. Therefore Vichy and mineral waters should not be allowed when the patient is taking an alkaline mixture. Flaxseed, sassafras-pith, and slippery-elm teas may also be given, moderately sweetened and nicely flavored.

As in anterior so in posterior urethritis, we should resort to local medication just as soon as we can do so without discomfort to the patient and increase of the inflammation. It is well, therefore, to begin with irrigations of warm boric-acid water, as directed in the section on the

Treatment of Acute Anterior Urethritis, and then to progress in the ordinary cases on the lines laid down there.

In the severe cases it is well to begin with nitrate of silver in much dilution as early as possible, and to increase the strength of the solution, which should always be hot, until it reaches 1:8000 or 1:4000. By this time the tenesmus will be much lessened, the irritation less frequent, and the hæmaturia less copious. When these favorable symptoms are progressing it is well to use caution and not to abruptly increase the strength of the irrigation. Later on warm irrigations of alum, of sulphate of zinc, and of permanganate of potassa may perhaps be useful in giving the parts a rest from the action of the nitrate of silver. Under favorable conditions a cure is produced.

Under no circumstances should sounds or bougies be passed into the bladder at these times, since very much harm may be produced by them. In the declining stage of these mild cases the antiblennorrhagics in moderate doses may be given for a time, but they should never be pushed. The fluid extracts of kava-kava and of buchu are sometimes of seeming benefit in the declining stage of acute posterior urethritis.

In some very bad cases in which the tenesmus is dreadful in its severity and the hæmaturia is copious, when other methods of treatment have failed to give relief, very often results little less than miraculous will be produced by the instillation (see section on Treatment of Chronic Urethritis) of a few drops of a solution of nitrate of silver; 1:1000 or 1:500 may be given, care being taken that the urethra is not harmed by the passage of the catheter. In using this treatment it is well to be very careful to throw up only a few drops at first, and then watch the result. If, as sometimes happens, the patient's sufferings are calmed, on the next day or on the second day an injection of a larger quantity may be administered. Usually in these cases good will be produced by the 1:500 solution, and caution should be exercised in going higher than that standard. When the crisis is well over, mild boric-acid irrigation may be given, and further than that the cases should be treated according to the directions given in this chapter and in that on the treatment of acute anterior urethritis. When there is bladder complication in these cases the treatment is in the main similar. (See chapter on Urethro-cystitis and Cystitis.)

In middle-aged and old men with stricture and prostatic hypertrophy we sometimes see acute anterior and posterior urethritis. In these cases the sufferings are very great, and they are much intensified by the chronic impediments to urination. In some cases I have had to resort to aspiration until the severity of the urethral symptoms had subsided; then I went on with the usual local treatment as soon as I could get into the bladder with a very small catheter. Each case of this kind will present its special features, which should govern the surgeon in his efforts for relief.

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## CHAPTER XII.

## URETHRITIS IN YOUNG BOYS.

UNTIL within recent years our knowledge of urethral discharges in male infants and young boys was very vague, and all cases thus affected were regarded by writers on venereal diseases, surgery, and pediatrics as evidences of catarrhal urethritis. To-day, though there are many points still unsettled, our knowledge is much broader and more precise. Previous to the year 1885 attention had not been drawn to the possibility of acute suppuration in the urethræ of young male children originating in gonorrhœal pus. Up to that date the underlying causes of this urethritis in the young were said to be masturbation, friction of the clothes, mechanical and chemical irritants (foreign bodies in the urethra, catheters, the passage of vesical and renal calculi and urine containing an excess of uric acid), and certain skin diseases—pediculosis, scabies, and eczema. There can be no doubt that chronic masturbation may cause a subacute urethritis, but this as a cause cannot, as a rule, be assigned in the cases of babies in arms. The various irritants and traumatisms above mentioned may produce a urethritis, but its course, like that of the analogous condition in the adult, will be subacute and its duration short.

This being the condition of medical opinion prior to 1885, new light was thrown on the subject by Cseri<sup>1</sup> of Buda-Pesth in a paper which may be said to be the starting-point of our present broader views. Cseri reported the cases of two boys, aged four and five years, who had a profuse purulent discharge. Though the parents of these children were informed of the infectiousness of the disease, a fortnight later they brought an eight-year-old girl to Cseri suffering from purulent vulvo-vaginitis. In specimens of the discharge taken from these cases a micro-organism exactly similar in all particulars to the gonococcus was found. Cseri therefore claimed the infectious nature of these cases. Though Cseri's conclusions have been confirmed by Róna,<sup>2</sup> and though there is ample evidence to-day that there is a not infrequently occurring purulent urethritis of infectious character in young male children, we must not now go to the extreme in saying that all urethral suppurations in these young subjects are of gonorrhœal origin.

My own experience leads me to confirm the statement made by Koplik,<sup>3</sup> that there is a simple non-specific (certainly as to its origin) inflammation of the meatus and the anterior portion of the urethra. I have seen cases in which a mild urethritis of the distal part of the penis originated in balano-posthitis resulting from great uncleanness. In like manner the hyperæmia caused by pediculosis, scabies, and eczema of the penis and glans may cause a mild form of purulent urethritis in children,

<sup>1</sup> "Zur Aetiologie der Infectiösen Vulvo-vaginitis bei Kindern," *Wien. med. Wochenschr.*, vol. xxxv., 1885, pp. 707-739.

<sup>2</sup> "Ueber Aetiologie und Wesen der 'Urethritis Catarrhalis' der Kinder Männlichen Geschlechtes," *Archiv für Derm. und Syph.*, 1893, pp. 149 et seq.

<sup>3</sup> "Urogenital Blennorrhœa in Children," *Journ. Cut. and Gen. Diseases*, 1893, pp. 263 et seq.



as they do in the adult. Koplik thinks that in the act of crawling children may get filth on these organs, and from this infection may result. I have several times seen in boys from ten to thirteen years old well-marked subacute urethritis concomitant with balano-posthitis which originated in efforts to retract the prepuce for the first time and to break up adhesions. In these cases dirt, retained smegma, and urine undoubtedly played a prominent causative part.

The **symptoms** of mild urethritis in young male children are heat, swelling, pain on urination, and a scanty purulent discharge. This secretion may become encrusted on the glans or meatus, and when the crusts are removed a superficially eroded surface may be left.

The **course** of this disease is tolerably mild and its duration short, provided the exciting causes are removed.

Gonorrhœal urethritis in infants and young boys is not infrequently met with, particularly in the lower classes of society living in localities where children are closely herded together with adults. The disease is found in an endemic, quasi-epidemic, and sporadic form.

Little is known as to the very early stages of this infection, and there are no reliable facts as to the period of incubation.

The **symptoms** are similar to those of acute gonorrhœa in the male. The disease begins violently in heat, redness, and swelling of the penis, from which there is a profuse discharge of pus. The morbid process begins in the fossa navicularis, and promptly runs down to the bulb and into the posterior urethra. There is pain on urination, besides constant burning sensation in the urethra, and there may be painful nocturnal erections. In the early stage, by the two-glass test, the urine is found to be turbid in the first cylinder and clear in the second. But in most cases the posterior urethra becomes involved, and then the urine in both cylinders is turbid. With the invasion of the posterior urethra the symptoms resemble those of the adult similarly attacked. There is tenesmus, which which may be very severe and occur as often as every quarter of an hour in bad cases. In milder cases the desire to make water may occur every hour or at longer intervals. Sometimes mild and even severe hemorrhage may occur at the end of the act of urination. This disease runs the same persistent and rebellious course in the young that it does in the adult, and one or more months may elapse before cure is effected.

The **complications** may be balano-posthitis, lymphangitis, epididymitis, orchitis, and vaginalitis. In some cases chronic posterior urethritis is a result.

The virulent form of urethritis in the young may lead to stricture of the urethra. Róna reports two such cases. In one, a boy aged seventeen, the stricture probably began in an infection at the age of ten. The second case was that of a medical student of twenty-one, who also was infected in his tenth year. It is very probable that to virulent urethritis occurring in early life may be attributed many of the cases of stricture in boys and young men in whom a history of recent gonorrhœa cannot be obtained.

**Etiology.**—Enough has already been said of the probable causes of mild catarrhal urethritis in young male subjects. It is often difficult, and even impossible, to ascertain the cause and mode of origin of virulent gonorrhœa in the infant under two years of age, but the facts presented by

most cases warrant the opinion that the child had been tampered with by an older person and thus infected. Since intromission of the organ is not absolutely necessary for infection, it is probable that in some of these cases depraved women suffering from gonorrhœa place the child's penis in their vulva. Such instances have been known. Róna records fourteen cases of virulent urethritis in young boys, and others can be found in medical literature, in some of which the infection was derived from an infected female child or young girl. Then, again, the disease has appeared among a number of boys without the aid of a female, and owing to their ignorance, indisposition to talk, or to their persistent lying the mode of origin has not been learned. Crandall<sup>1</sup> reports the cases of a brother six and a sister eight years old who suffered from gonorrhœa. The sister claimed that she was contaminated by her brother, while the latter asserted that the girl infected him, and that she had been infected by a young man. Usually, then, in these cases of precocious depravity there is much difficulty in learning their origin; in some, however, the boys are shameless and barefaced, and readily and sometimes proudly assert that they were contaminated by a girl.

**Treatment.**—Simple catarrhal urethritis will promptly cease by the exercise of cleanliness and the use of a mild lead injection. The treatment of virulent urethritis of male infants and young boys should be that laid down for adults. The doses, however, should be adjusted to the patient's age, and the strength of the injections should be tempered in accord with the greater delicacy of the young sufferer's tissues.

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## CHAPTER XIII.

### CHRONIC URETHRITIS, OR GONORRHŒA, ANTERIOR AND POSTERIOR.

In the terminal stage of gonorrhœa the inflammatory process in very many cases becomes localized in some part of the urethra, and there remains in a latent or dormant state. There are a number of conditions which tend to render the course of gonorrhœa chronic. In the first place, there is the natural tendency of the disease to linger indefinitely in the tissues. As we have already seen, gonorrhœa is not a simple superficial catarrhal condition, but a strongly-marked exudative and catarrhal inflammation which is very rebellious to our best-directed efforts in treatment. Then, again, many patients consider themselves cured just as soon as the discharge ceases, and will submit to no further treatment, though examination of the urine shows the presence of tissue-exudates. Another and a prolific cause of chronic gonorrhœa—or gleet, as it is called—is sexual and alcoholic indulgence during the decline of the chronic stage. Still another cause of the indefinite perpetuation of the disease is a too active

<sup>1</sup> *New York Med. Journ.*, April, 26, 1890.

and protracted treatment, either by antiblennorrhagics or injections, or by both combined. Many an obstinate gleet has thus been induced by the intemperate use of drugs.

It is out of the question, in the vast majority of cases, to induce patients suffering from gonorrhœa to spare their physical forces. This is particularly the case in the declining stage. In the better class of intelligent patients we can in many instances control them to a certain extent, and cause them to avoid athletic exercises, horseback riding, bicycling, and other violent exercise. Among working-men, wage-earners, however, the daily necessities demand the daily toil, and in many of these cases the physical exercise tends to cause gonorrhœa to become chronic. The tissues of some subjects are more vulnerable than those of others; this particularly applies to weak, debilitated subjects, the scrofulous, and the tuberculous.

In former years gleet, also called *goutte militaire*, was looked upon as a chronic inflammatory process seated in some portion of the anterior urethra. Its symptoms are the morning drops—the pus-accumulation of the night—which may be small in quantity and greenish-white in color. There may be a minute drop, a large pea-sized drop, or three or more drops. In other cases there is simply gluing of the lips of the meatus together, on the separation of which a film of glairy muco-pus is seen. In other cases there is not sufficient secretion to produce a drop. In a third class of cases there is simply increased moisture at the meatus, and a scanty colorless secretion, like glycerin, may be forced out by a little pressure.

It is well to mention that some over-anxious patients, who in time past have suffered from gonorrhœa, alarmed about themselves, come to the surgeon, stand before him, and by firm pressure and milking of the glans and meatus cause to exude a slight clear mucous secretion, which they think is gleet. In very many instances their only trouble is the hyperæmia induced by their own violent manipulations, which result in a slight increase of the normal mucus.

There can be no doubt that in most cases of the morning drop there is an inflammatory focus in the anterior urethra, but it does not by any means follow that the posterior urethra is healthy, since it is frequently the more active focus of trouble. In former years gleet meant, in general terms, chronic anterior urethritis, and the treatment was based on that diagnosis. To-day we know that chronic gonorrhœa of the posterior urethra is a quite common affection, and that it may exist alone or in combination with localized anterior urethritis.

Chronic gonorrhœa or urethritis, then, may be seated in some part of the pendulous urethra, particularly at the peno-scrotal junction or anterior to it, in the bulbous portion, and in the posterior urethra. A frequent combination is posterior urethritis with inflammation of the bulbous urethra. Chronic inflammation of the urethra at the peno-scrotal junction may exist alone or in combination with posterior urethritis.

There are certain features of these localized forms of chronic urethritis which demand mention.

In general terms it may be said that the morning drop is indicative of trouble in the pendulous urethra, the secretion of which flows toward the meatus during the night. During the day the secretion may not be



noticeable, owing to the quite frequent flushing of the urethra by the urine. In some cases the lips may be glued together during the day by the scanty secretion which gravitates downward in the intervals of urination.

In many of these cases of chronic anterior urethritis all discharge ceases to be seen at the meatus, and the true state of affairs can only be ascertained by the examination of the urine, or by the use of the endoscope. If distinctly limited to the anterior urethra, the urine in the first glass will contain threads or masses of tissue-products, and that in the second glass will be clear. In all cases, however, the examination should be pushed still farther: the anterior urethra should be carefully and fully irrigated, and then the urine should be passed into one or two glasses. In the fluid which has been used in irrigation will be found the products of inflammation of the anterior urethra, and in the first glass those of the posterior urethra if it is the seat of inflammation.

In the bulbous urethra the gonorrhœal process shows a marked tendency to become chronic, and its persistency causes it to be very rebellious to treatment. In this part of the urethra the vascular supply is so great, the tissues are so succulent, and we may say relaxed, that every condition favorable to chronic inflammation is there present.

Chronic urethritis of the bulbous urethra may give rise to no secretion visible at the meatus. Then, again, the pus may be so copious and fluid in consistence that it may glue up the meatus in the morning and perhaps during the day, or may escape once a day or oftener as a decided drop. Owing to the fact that the bulbous portion is in direct continuity with the membranous urethra, this portion may be the seat of hyperæmia or inflammation in bulbous urethritis. In these cases washing out the anterior urethra, and then examining the urine passed in a vessel, may not give exact information as to the seat of the lesion. In this event the parts may be examined by means of the endoscope, which should be used with great delicacy and as little backward and forward motion as possible. In this way the seat of the affection may be definitely ascertained.

A chronic discharge, usually small in amount and viscid in consistence, may be developed as a result of chronic gonorrhœal inflammation of the glands of Littre and the crypts of Morgagni. In these cases the lacuna magna and other large follicles may be the seat of inflammation. Chronic follicular urethritis is usually uncomplicated with posterior urethritis. It is found on the lips of the meatus, just within that orifice, and as far down as the bulb.

Chronic inflammation of Cowper's glands has been known to cause a discharge into the urethra which was intermittent in character. In some cases of chronic anterior urethritis the patient suffers no inconvenience whatever. In a few cases the patients complain of pain localized at some part of the urethra.

Chronic posterior urethritis follows in many cases the subsidence of the acute process. Owing to the complexity of structure of the posterior urethra the symptomatology of this affection is often quite well marked. When there is simply uncomplicated chronic inflammation of the mucous membrane the symptoms may be negative or very slight in character. But when the prostatic sinuses, the orifices of the ejaculatory ducts, the utriculus masculinus, and the caput gallinaginis are, together or in

part, the seat of trouble, we find a varied group of symptoms referable to the sexual sphere.

In chronic urethritis distinctly limited to the posterior urethra there is usually no escape of pus into the anterior portion, for the reason that it is small in quantity and viscid in consistency. There are, however, border-line cases in the extreme terminal stage of the acute affection in which the pus is still rather copious, and it escapes through the membranous urethra and passes toward the glans. We have already seen that the compressor urethræ muscle does not usually contract the lumen of the urethra to a hair-sized calibre, and that in general it is a moderately patulous canal at this point. There certainly is not, in the majority of cases, such a tonicidity of the compressor urethræ muscle as will keep back a quite copious discharge.<sup>1</sup> While in many cases, owing to its small quantity, the pus may be retained in the posterior urethra by the cut-off muscle, in some cases it certainly is not thus dammed backward. The cases of chronic posterior urethritis in which a discharge reaches the meatus are very rare, but they occur.

In very many cases of posterior urethritis, there being no visible discharge and the patients complaining of no symptoms referable to the deep urethra, the affection remains dormant, latent, and unrecognized. Thus the cases may drag on for one or more, and even five, ten, and twenty, years without giving any indication of lurking trouble. In some of these cases an exacerbation occurs, and then the patient realizes that he has had an uncured gonorrhœa.

In some instances the exacerbation of the posterior urethritis is sub-acute in character, attended only with mild or insignificant symptoms, and its presence would not be suspected or sought for had not an attack of epididymitis or epididymo-orchitis developed as a complication. In many cases of this deep-seated urethritis, in which epididymitis or epididymo-orchitis was developed in the initial attack, recrudescences in the testicular trouble are frequently developed at late and remote periods as a result of an exacerbation in the posterior urethra.

In somewhat rare instances chronic posterior urethritis, usually as a result of excesses, becomes developed into a true acute attack with all its symptoms and its discomforts. It may thus run its course, but in some cases the inflammatory process extends forward into the anterior urethra, which also becomes the seat of an acute phlegmasia. In these cases, when the discharge is well established in the anterior urethra, the sufferings of the patient, experienced when the posterior segment alone was affected, cease, and the case then takes on the features of a gonorrhœa of the totality of the urethra in its declining stage.

What has already been said as to the means of recognizing the existence of acute posterior urethritis applies with equal force to the diagnosis of the chronic affection. In this connection it is well to remember that small comma-like fleecy plugs or threads, which are thought to be formed in the excretory ducts of the prostatic glands and voided with the last drops of urine, being pressed out by muscular and prostatic contraction, are quite diagnostic of chronic posterior urethritis.

<sup>1</sup> This is well shown in some cases of chronic prostatorrhœa in which the mucus constantly dribbles from the meatus, and of which patients make much complaint.

The **symptoms** of chronic posterior urethritis are many and varied, mild and severe.

This affection was formerly rather vaguely understood, and to it the names neuralgia of the bladder, neuralgia of the neck of the bladder, irritability of the bladder, *cystite du col*, and *contracture du col de la vessie* have been given. In the light of modern study all these names may be dispensed with, and the term "chronic posterior urethritis" may be retained.

Cases of this affection may be, for purposes of study, separated into groups according to the nature and severity of their symptoms.

There is found in practice a goodly number of cases in which a frequent desire to urinate and some uneasiness at the end of the act, and sometimes at its beginning, are the only symptoms complained of. In some of these cases the increased frequency in urination is not much above normal; in others it is well marked. In some cases the pain is slight and dull, or of a quick, stabbing, but very ephemeral character. In others it is dull, heavy, perhaps spasmodic, and radiates into the rectum, pelvis, testes, and groins. In these cases the act of urination may go on smoothly, or it may be interrupted by slight or severe spasm of the compressor urethræ muscle or of the detrusor vesicæ muscles. This condition has been called "cysto-spasmus." It is liable to occur after coitus or difficult defecation. In other cases there is no disturbance of urination at all, but patients complain of dull or aching pain in the perineum, deep in the pelvis and prostate, and in the rectum. Sometimes these patients complain of pain over the pubis and of uneasy, vague pains in the cord and testes. In some cases mild and even severe neuralgic pains are complained of in the loins, groins, and thighs. (These painful symptoms, particularly when severe, are fortunately not continuously present.) They vary from day to day, so that the patient has intervals of comparative comfort.

Perhaps the most serious and, for the physician, trying cases of posterior urethritis are those in which there is some disturbance of the sexual function. Some patients complain of a severe stabbing pain at the moment of, or after, ejaculation of the semen. Others state that all pleasurable sensations are either absent or lessened in degree in sexual intercourse, and they are thereby much worried. In still other cases the ejaculations occur before intromission or shortly afterward.

In some cases pollutions are frequent, and with their occurrence a diminution in the sexual appetite is felt. Many of the patients become weak, nervous, and apprehensive. Their digestion becomes poor, and they suffer from constipation. Then the passage of a hard fecal plug presses on the prostate and expels the accumulated muco-pus, which appears at the meatus, causing the patient to think he is losing semen. In some of these cases some of the secretion of the seminal vesicles is at the same expelled, and this also to many is convincing proof that they are suffering from spermatorrhœa. Occasionally these patients are much alarmed at the occurrence of bloody pollutions, which are due to great hyperæmia of the ejaculatory ducts. In any of these cases of disturbance of the sexual function we are liable to find more or less deterioration of the health. This may consist simply of weakness and lassitude, and it may be a condition of great nervousness, of melancholia,



or even of true neurasthenia. Between these two extremes there are many degrees of bodily and mental debility.

The **pathological appearances** of chronic urethritis are quite varied, and in the main striking. So little is shown by the ocular examination of post-mortem specimens of urethræ the seat of chronic trouble that the details will not be given, particularly as the minute pathological changes have already been described.

By the use of the endoscope the morbid appearances of the urethra are well shown. In general it may be said exploration of the urethra by the endoscope should be confined to the anterior urethra, which may thus be examined without damage and detriment to the patient. The condition of the posterior urethra can be so well determined by the examination of the urine and by rectal exploration of the prostate, and in many cases by a consideration of the symptoms, that endoscopy, which is (except to skilled experts) a difficult procedure and often followed by local injury, should only exceptionally be resorted to.

Chronic urethritis of the follicles shows itself in small deep-red pus-oozing spots of the size of a pinhead to that of a pea. The lacuna magna and similar crypts may thus show evidence of inflammation or the orifices of the follicles of Littre may be involved.

The most constant morbid condition seen in chronic anterior urethritis is a rather deep-red, even purplish, color of the mucous membrane, which is more or less thickened. This redness may involve a segment of the canal or a limited portion on one or two sides of the canal. In these cases more or less pus, thin or inspissated, may be seen in the examination. Thickened red circumscribed spots or plaques of chronic inflammation are very common. The next appearance quite commonly seen is called by some granular urethritis. The membrane is thickened, red, even purplish in streaks, and rough and studded with small projections, which consist either of epithelial hyperplasia or of little eminences caused by the growth of new capillary vessels. This condition is frequently found in the bulbous urethra and also in the pendulous portion.

A further advanced form of this granular urethritis is called papillomatous urethritis, in which minute but distinctly defined raspberry-like masses of new growth are scattered over a segment of the canal. In some cases there may be but one tuft of papilloma, and in others there may be many such. These little new growths are formed of round-cell infiltrations, new capillaries, and epithelial hyperplasia. They are usually found a few inches from the meatus and as far down as the bulbous expansion of the urethra. Since the most careful passage of a soft bougie or catheter in cases of papillomatous urethritis will often cause slight bleeding, the occurrence of this symptom may lead to a suspicion of its cause.

Erosions and ulcerations of the urethra are frequently the cause of chronic urethritis. In the erosive form the mucous membrane is thickened and red, and in spots the epithelium is seen to be lost. Ulcers of the urethra are usually small and sharply limited, and the evidence of loss of tissue can be clearly made out. The erosive form and the ulcerative form of chronic urethritis may coexist, and may involve only a limited portion of the urethra. Then, again, we sometimes see involvement of a considerable segment of the canal in redness and swelling,

which is studded here and there with erosions and ulcers and granular and papillomatous growths.

Now, it must be remembered that all these changes are secondary to the chronic exudative process in the submucous connective tissue, which is the primordial lesion. As a result of this morbid process the changes in the mucosa and in its vessels, glands, and epithelium result which are revealed to the eye by the microscope.

The morbid appearances of the mucous membrane of the posterior urethra are not conspicuously striking. They consist of thickening, more or less papillation, together with increased redness. Frequently the caput gallinaginis and the orifices of the prostatic ducts are seen to be swollen. The underlying pathological process is precisely similar to that of the anterior urethra. In the threads which contain pus and epithelium of various kinds gonococci are rather infrequently found. In a recent essay Neisser<sup>1</sup> claims that the gonococcus can be found in many cases of posterior urethritis and of chronic prostatitis if the proper measures are taken to discover it. Neisser washes out the anterior urethra thoroughly with boric-acid water. Then a solution of carbolic fuchsin is thrown into the posterior urethra, and this stains all tissue-products present there. The patient then urinates, and thus frees the posterior urethra of its tinted contents. Then the prostate is "stripped," after which the patient urinates, and with the urination the expressed contents of the prostatic follicles are carried away. Another method is to wash out the posterior urethra (presumably after urination) with boric-acid water, which the patient expels from the bladder. When this fluid comes away clear, it is safe to say that all secretion seated on the mucous membrane of the prostatic urethra has been carried away. Then, some boric-acid water still being in the bladder, the prostate is "stripped," and the patient then expels the contents of the bladder as well as all deep-seated inflammatory products.

The question of the infectiousness of the secretion of chronic gonorrhœa is one which frequently arises, and concerning which we have no precise data. In order to treat the subject intelligently we must study the peculiarities of each case and be guided by the results obtained. It will not suffice to merely state generalities, or to harp on the persistence of the presence of the gonococcus, or to endeavor to draw conclusions from statistics. We know by experience that in the third to the sixth month after the decline of a case of gonorrhœa in many patients a still infecting pus may be found in the urethra. In many other cases no such pus can be found a month or two after the cure of gonorrhœa. It follows, therefore, that there is danger of contamination of women, in many cases, by men who were seemingly cured of gonorrhœa six months previously. Consequently, we must be on our guard when men having within half a year only recovered from gonorrhœa ask our opinion as to the propriety of marriage. In such cases the urine, particularly that of the early morning, should be carefully examined. If pus-cells are still present, together with epithelial cells, the patient should be subjected to further treatment, even though the gonococcus cannot be discovered in the microscopic field.

<sup>1</sup> "Zur Bedeutung der Gonorrhöischen Prostatitis," *Verhandl. der Deut. Dermatol. Gesellschaft*, Wien and Leipzig, 1894, pp. 325 et seq.

My own experience convinces me that, in general, after the lapse of six months from the time of cure, provided there has been no recurrence, it is safe for a man to marry. It is a matter of common experience to see men who have only one or two months before recovered from gonorrhœa have intercourse with various healthy women with absolute safety to the latter. Though we can thus speak positively concerning these cases where men do as they please, we must be guarded when we are called upon for an opinion and do our utmost to protect the innocent. There can be no doubt that many women escape infection by men recently recovered from gonorrhœa by reason of the fact that the secretion is small in amount and is washed out of the urethra in urination.

I am so constantly seeing men who have chronic anterior and posterior urethritis, who have intercourse over long periods with women, wives and mistresses, without communicating gonorrhœa to them, that I am led to the belief that in very many of these cases the pus is inactive or effete. In such cases the microscope often shows a field covered with small withered pus-cells and large, flabby epithelial cells studded with small fat-globules. When I see these features I am generally pretty certain that the secretion is not liable to cause infection. Exacerbations of such a low grade of morbid process may, however, produce a pus competent to infect.

I think it may be stated without fear of contradiction that if the vast number of cases of chronic suppuration of the urethra which are known to exist in men gave issue to infecting pus, gonorrhœa in women would be as common as it is in men. This certainly is not the case, for there are at the very least thirty cases of gonorrhœa in men to one case in women. This is under- rather than over-stated.

To sum up, we may say, on general principles, that danger lurks in all forms of urethral pus, particularly in that which is found within six months after the supposed cure of gonorrhœa. In older cases it may be dangerous, but daily experience shows us that for some reason or other women may with impunity cohabit with men whose urethræ secrete pus sparingly. In many cases personal cleanliness and the salutary effects of urination may be the underlying causes of this immunity. In this connection it is well to repeat what has already been said. Too much stress is laid by some authors upon gonococci and other microbes in chronic urethritis. In very many cases the gonococcus has produced its pathological results and has disappeared, leaving an inflammation of the vessels and cell-infiltration behind it, which is then uninfluenced by microbes. This smouldering inflammatory patch gives forth pus which may not contain microbes; hence it produces no bad result. This phoenix-like character given by many to the gonococcus is in most cases a myth.

**Treatment of Chronic Urethritis, Anterior and Posterior.**—When gonorrhœa, or urethritis, has lasted three months, and is then in a decidedly subacute condition, it may be called chronic.

It must be clearly borne in mind that only in rather exceptional cases is the morbid process strictly limited to the anterior urethra. In very many cases the posterior urethra is involved, and with it usually the contiguous portion of the anterior urethra, including the bulbous segment, and even parts beyond that, may be similarly affected. In some cases the posterior urethra alone is involved.

In the treatment of chronic gonorrhœa the history of the case must be



carefully considered. Then it is necessary to determine the seat and extent of the morbid process and its nature and physical character. In every case the first diagnostic points should be obtained by the careful examination of the urine. At the first examination instruments for diagnostic purposes should be guardedly used.

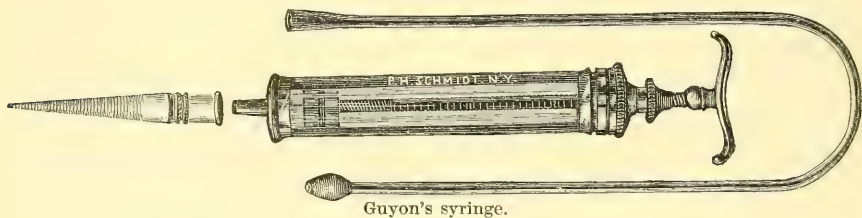
The disease lurks, particularly in very chronic cases, in various parts and exists under different conditions, so that there are scarcely two cases which thoroughly resemble each other. The consequence, therefore, is that there is no specifically routine treatment for chronic urethritis, but each case must be treated on the basis of its morbid process and of the therapeutic indications presented by it.

The duration of the urethritis has an important bearing upon its treatment. Let us first consider the cases in which the disease has lasted only a few months. Such patients may complain only of the morning drop, or they may state that they seem well so long as they use an injection, abstain from coitus, and do not drink beer and alcoholics or eat highly-seasoned food. When they cease injecting and indulge in creature comforts and excesses, the morning drop reappears, with perhaps a more or less profuse discharge during the whole day. Examination of the urethra in these cases shows a catarrhal and exudative condition from the bulb forward, perhaps nearly to the meatus. In many of these cases the posterior urethra is also involved. The morning urine is rather cloudy, like turbid cider, contains much mucus, and some long thin or thick threads (sometimes three or four inches long). There may or may not be a few gonococci present. In these cases the best treatment is irrigations of the posterior and anterior urethræ, using at first warm solutions of alum and sulphate of zinc after the manner of Ultzmann,<sup>1</sup> beginning with a strength of 1 : 500, and increasing according to the result obtained. Usually one irrigation daily is sufficient, but perhaps two may be well borne. The sensations of the patient and the condition of the urine are infallible guides as to the required frequency of treatment. As a general rule, after one or two weeks' treatment these irrigations seem to lose their efficacy, having done some good, but not having produced a cure. Perhaps in these conditions permanganate-of-potassa irrigations (always hot), 1 : 1000 or 1 : 2000, may bring about a cure. If this remedy fails, we resort to nitrate of silver, beginning with solutions of the strength of 1 : 16,000 or 1 : 8000, and sometimes even weaker; and this usually brings about a cure if the treatment is carefully administered. If the morbid process is more severe in the anterior urethra, the bulbous reflux catheter (see Fig. 57) should be introduced as far as the bulb, and one or two syringefuls of the irrigating fluid should be injected. The posterior urethra should then be similarly treated. Sometimes it is necessary to finish with quite strong, deep injections. In these cases much pain is frequently produced by the passing of sounds, particularly of large ones. This fact should always be borne in mind, since many patients thus treated suffer severely, while in others the disease is so aggravated that it is most difficult to cure. Some of these cases are rendered practically incurable even if the most judicious and prolonged treatment is followed. Too much attention cannot be paid to the fact that in some cases of chronic gonorrhœa sounds may be productive of incalculable harm.

<sup>1</sup> *Pyuria, etc.*, New York, 1884, pp. 64 et seq.

When the disease is limited to the bulbous portion, where it shows a great tendency to remain indefinitely, the retrojections of alum, sulphate of zinc, and nitrate of silver may be used. These injections will materially modify the morbid process, and sometimes cure it, but they often fail to bring about a thorough cure. In that event it is well to make direct local applications of solutions of nitrate of silver, beginning with a solution of 1:2000, and perhaps going as high as 2:500. Guyon<sup>1</sup> and his followers advocate very strong solutions of this drug, such as 1:30, 20, and 10. My experience has taught me that we get better results and cause less pain by using weaker solutions. For the treatment of chronic gonorrhœa of the bulbous urethra Guyon's syringe is a

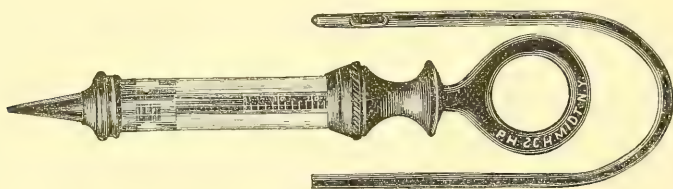
FIG. 63.



Guyon's syringe.

very useful instrument. It consists of a Pravaz syringe with a screw piston to which is attached a conical cannula grooved screw-like on its external surface to ensure its retention in the expanded proximal end of the *bougie à boule*. The bulbs of the bougie vary in size from 10 to

FIG. 64.



Author's syringe.

20 French. By turning the handle of the piston once around two drops are expelled from the syringe. It is well, before the introduction of the bougie, to turn the handle until it is filled with the liquid and all air is expelled. A less complicated and perfectly effective syringe is the one generally used by me. There is nothing whatever original about this syringe. It is simply a well-made instrument, very easily worked, having a ring and shoulders for the thumb and fingers, and a very conical nozzle, which will fit into any small soft catheter. The piston is marked with numbers to regulate the drops. The injecting medium is any well-made soft-rubber catheter, 10 to 12 or 14 French, cut off to measure eight and a half inches in length. When the catheter is introduced six or six and a half inches, its end is in the sinus of the bulb, and the very slight impediment it encounters there shows the operator that

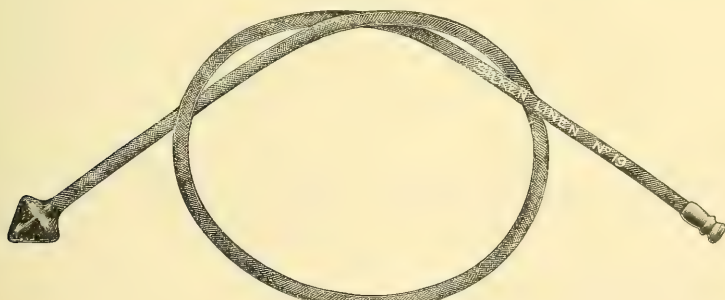
<sup>1</sup> "Leçons clin. sur les Uréthrites blennorrhagiques," *Annales des Mal. des Org. Gén.-urin.*, vol. i., 1883, pp. 612 et seq.

he is just at the opening in the triangular ligament. This little catheter, being slowly passed, never causes pain or irritation. Then ten or fifteen drops of the silver-nitrate solution may be thrown into the urethra. This treatment may sometimes be varied by using 1, 2, or 3 per cent. sulphate-of-copper solution, or 3 to 6 per cent. sulphate-of-thallin solution. This treatment may be administered by the surgeon every five days or twice a week, and perhaps oftener if the indications of the case point to the necessity of increased frequency. In the intervals the patient may use mild stimulant and astringent injections by means of the penis-syringe. This form of chronic urethritis being very rebellious, it is sometimes necessary to pass an endoscopic tube down to the bulb, and, having ascertained the morbid appearances, to sparingly apply on cotton at the end of an applicator or *porte remède* a strong solution of silver nitrate (gr. 30 to  $\bar{3}$ j water).

In the more chronic cases of anterior urethritis we find spots, patches, and areas of inflammation at the peno-scrotal angle (sometimes seemingly caused by the pressure of the suspensory worn during the declining stage) and in the pendulous urethra as far as its beginning.

The first essential in the treatment of these cases is to locate the trouble and to determine its nature. Now, in this part we find sub-epithelial infiltration with or without a greater or less epithelial hyperplasia, erosions, and superficial ulcerations, always accompanied with submucous thickenings and follicular inflammation. The thickened mucosa may be granular, villous, or papillomatous. The urine can do little in enlightening us as to the exact nature of the morbid process unless it contains old flabby and fatty epithelial cells, which point to an old ulcer which is in too atonic a condition to heal of itself. In these cases much aid can be obtained as to location by the *bougie à boule*.<sup>1</sup> This instrument consists of conical or acorn-shaped heads with a well-marked sharp but gently rounded shoulder, which is attached to a flex-

FIG. 65.



Bougie à boule.

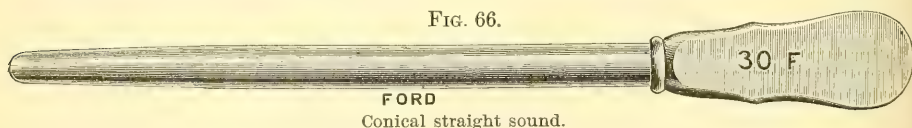
ible gum-elastic staff. (See Fig. 65.) For the cases under consideration we may need these *bougies à boule* in size ranging from 18 to 30 French. For strictures we may use the smaller sizes, which begin as small as 8 or 10 French.

<sup>1</sup> The instruments made by the J. Ellwood Lee Co. of Conshohocken, Pa., are far superior to any imported.



Now, it must be distinctly understood that all of the above-mentioned inflammatory conditions cause a greater or less thickening of the urethral walls, and they impinge more or less upon its calibre. There is a very prevalent tendency now-a-days to call any condition which may interfere with the easy passage of the *bougie à boule* forward or backward a stricture, and thousands of men have been cut for stricture when they had only one or more of the above-mentioned conditions. A little thickened patch of infiltrated mucous membrane, perhaps seated on one side of the canal or perhaps encircling it, will prove an obstacle to the easy-sliding forward and backward of the bulb, and the case might be mistaken for one of annular stricture of large calibre. An ulcer or erosion with its concomitant thickening will offer some resistance, and the bulb on its return may jump and jerk over it. The epithelial hyperplasias which often accompany submucous infiltration jut up in the canal and more or less narrow its calibre and impair its suppleness. A swollen follicle may act in a similar manner. Papillomata will offer more or less resistance, but as they bleed so readily, even on gentle manipulation, their nature may be suspected. All inflammatory conditions render the urethra, particularly its pendulous portion, thickened and less supple, and more or less impinge on its calibre and destroy its expansibility. Bearing these facts in mind, it is a serious matter to decide without full, painstaking examinations that a man has stricture. Having ascertained that there is a localized chronic inflammatory spot or area, the injection of a few drops of nitrate-of-silver solution, 1 : 1000 or 1 : 500, may be made twice a week or oftener. When cases resist this treatment, it is well to resort to the endoscope in order to determine just what condition exists. Erosions, ulcerations, granulations, and urethral thickenings require circumscribed applications of solutions of nitrate of silver perhaps as strong as 2 : 500, and very rarely indeed stronger—1 per cent. These applications should be skilfully and carefully applied, in some cases through the endoscopic tube, in others by means of Guyon's syringe or my own syringe. The patient in the intervals of treatment may use astringent injections with the penis-syringe. When the inflammatory condition is just external to the bulb, particularly when it is seated in the pendulous urethra in cases where there is not much hyperæmia, much benefit can be derived from the introduction of the

FIG. 66.



Conical straight sound.

straight steel sound and the gentle pressure or massage of the urethral canal for a few minutes. Care must be taken that no violence be done. In some cases this procedure aids the nitrate-of-silver injections in the absorption of the effused cells.

Inflammation of the urethral follicles, particularly when several inches down, is a condition which resists treatment and is difficult to handle. The parts must be exposed by means of the endoscope, and touched with a strong nitrate-of-silver solution on cotton at the end of a very fine silver probe, which, if possible, should be gently pushed into the duct. Some

authors recommend the destruction of the follicle by means of a very minute galvano-cautery needle. Great care and circumspection should be used when this rather heroic procedure is resorted to. After any of these applications it is well to inject the urethra with lead-water twice a day.

Follicular sinuses in the fossa navicularis and just within the lips of the meatus may, after thorough irrigation, be injected with a few drops

FIG. 67.



Ultzmann's deep urethral syringe.

of silver-nitrate solution (2:500) by means of the hypodermic syringe, the needle of which is made blunt by the removal of its point. In several cases of juxta- and intra-urethral sinuses I have produced a cure by applying on a small silver probe a coating of nitrate of silver obtained by melting the drug with heat. A few grains of the silver salt are placed in

FIG. 68.



Ultzmann-Keyes syringe.

a small platinum crucible, which is exposed to an alcohol flame until liquefaction occurs; then the probe is dipped into the crucible and is thus charged.

In the treatment of posterior urethritis with or without anterior urethritis great care is required to determine as nearly as possible the exact condition of affairs. In the more recent cases we sometimes find some evidence of bladder incompetence (the urine showing no involvement of that viscus), which shows itself by the escape of a little (ʒij to ʒss or more) residual urine when the eye of the catheter reaches the neck of the bladder. In these rather early cases mild irrigations of the astringents and of permanganate of potassa may be used, and perhaps with benefit. The most uniformly effective agent here also is the nitrate of silver, which may at first be used well diluted, 1:16,000 or 1:8000, in the form of hot irrigations. These may result in cure, but if the result is not perfect injections of the same drug may be used. For injecting the posterior urethra the Guyon syringe, to my mind, is objectionable, for the reason that its bulbs, particularly when the larger ones are employed, cause more or less spasm of the compressor urethræ muscle, and as a result an uneasy and even painful sensation is left after its withdrawal.

The Ultzmann syringe and the Keyes modification, in which the syringe is soldered to the cannula, and to it two wings or holders for the fingers are added, unless used with the greatest care often cause patients dis-

comfort and even pain. By them minute quantities of fluid may be thrown into the posterior urethra with much accuracy. The introduction of these instruments often provokes vigorous spasm of the compressor urethræ muscle. In my opinion the use of these instruments should be confined to the purposes for which they were originally intended by Ultzmann—namely, to apply a few drops of very strong silver-nitrate solution to the posterior urethra and verumontanum in case of sexual disability, in prostaticorrhœa, and in spermatorrhœa. They certainly are not instruments to be used by unskilled hands or by persons who use them very infrequently. My preference is decidedly in favor of the simple little syringe with the small-calibre, soft-rubber catheter already described. When it is necessary to inject the posterior urethra, using the small catheter cut off at eight and a half inches, this tube should be introduced about seven or seven and a half inches, when, in the majority of cases, the eye of the instrument will be just at the beginning of the prostatic urethra. In men with very long urethræ a catheter thus introduced might only reach the membranous urethra, and then pressure on the piston would not be followed by the expulsion of any fluid, owing to the compression exerted on the catheter. In this event it is only necessary to push the catheter a little farther onward, into the prostatic urethra, where no obstacle will be encountered. By this syringe we can inject ten or twenty drops of a silver-nitrate solution, beginning in the more recent cases with 1:2000 or 1:1000, making an injection once a day, every second day, or at longer intervals, according to the result produced and the patient's sensations. It will rarely be necessary to use stronger solutions than 1: or 2: 500. As these cases progress gradual dilatation may afford aid, provided great care and caution are used. If this little operation causes pain, and if the urine shows more pus- or tissue-elements than it did before, it is well to desist and keep on with the injections.

For older and very chronic cases of posterior urethritis the stronger silver-nitrate injections, 1:500 or 250, may be used. In my experience, fifteen drops or more of these solutions produce better effects than a more sparing injection of stronger solutions. These injections should be given every third or fourth day. They may, however, produce benefit in some cases if made more frequently. Daily injections are liable to cause acute suppuration, which means irritation, and that must be avoided.

Posterior urethritis, accompanied by sexual disability, premature ejaculations, pollutions, and absence of erections and loss of sexual desire, usually requires the injection of a few drops of the stronger solutions just mentioned. In these cases especially it is well to carefully examine the prostate *per rectum*. This organ is frequently found rather swollen both laterally and toward the rectum, and the finger-tip may produce an uncomfortable sensation and even pain. In many of these cases gentle repeated pressure with the finger-tip on the organ causes a thick, viscid, grayish secretion to escape from the meatus, and as a result of three or four such treatments patients frequently are benefited. In these cases the disease has invaded the prostatic follicles, and within them is stagnated muco-pus which keeps up the irritation.

Besides these local measures, patients thus afflicted need fresh air, relaxation, good hygienic conditions, and attention should be paid to



their sexual hygiene. In some of these cases, where there is much hyperæsthesia of the posterior urethra, accompanied by erotic symptoms, much benefit may be produced by the introduction of steel sounds previously chilled with ice. This procedure should be cautiously carried out and its effects carefully watched. It should not be very frequently adopted, and at the most two séances a week should be given, and on these days the deep injection should be omitted. If good is going to follow, the patient will at once speak of his improvement. Should it produce a dull pain or an uneasy sensation, its use is contraindicated. It is always well not to use very large sounds; those having a calibre of 20 or 22 French are the best.

Some surgeons may desire to try other measures and methods of treatment for chronic urethritis, in which event I would refer them to the various views and exploitations, as well as instruments and methods, detailed in the chapter on the treatment of acute urethritis. They certainly will find food for serious thought there, and perhaps suggestions which may be of practical benefit in a deterrent direction.

*The Use of the Endoscope.*—In the treatment of chronic urethritis the endoscope is useful under certain sharply-drawn restrictions. As a means of localizing an inflammatory focus, of viewing surface appearances, and of allowing the use of topical applications under free ocular inspection it is often of signal benefit. It is an instrument of reserve rather than of routine, and it always should be used in a rational and conservative manner. It is to be regretted that it has been used very much as a toy, and has been to some simply a surgical hobby. There are those who have been so unkind as to say that some surgeons ostentatiously display and use it as a means of impressing patients with their skill and science. Patients, however, as a rule, are only profoundly impressed when science and skill give them relief, and they are correspondingly disappointed, and even indignant, when they have been submitted to discomforting and elaborate manipulations which have done them no good and perhaps some harm.

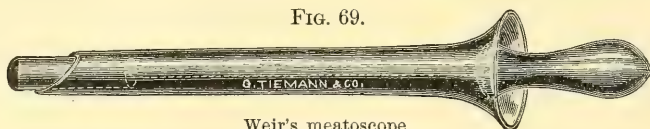
As a general rule, it may be said that when in the treatment of chronic anterior urethritis the case resists the usual methods properly applied, then it is well to use the endoscope to determine the exact seat and nature of the lesion. It is well to sound a note of warning as to the inspection of the posterior urethra. It is safe to say that many persons who cajole themselves with the idea that they have inspected this region have greatly deceived themselves. It is often very difficult to efface the subpubic curve with the endoscope tube, and often much damage is done in the attempt or in its accomplishment. A skilled expert only should make endoscopic examinations of the posterior urethra.

The precipitate use of the endoscope at the first examination of a case, before the other and less radical methods of examination have been tried, is to be very much condemned.

The efficient use of this instrument requires much time, study, and observation. The aim of the surgeon should always be to use such delicate care and circumspection that the operation is made as little troublesome and painful to the patient as possible. At the present time the tendency is to use only the large and complicated instruments, and we see little, if any, mention of the simple endoscopic tubes. These simple

tubes can be very readily introduced, and a good view of the urethra as far as the bulb may be obtained by their means, supplemented by the sun's rays or the electric light thrown down their lumen by means of a hand or a forehead mirror. I strongly advise any one beginning the study of endoscopy to employ the Weir meatoscope or the F. N. Otis endoscopic tube. The first instrument will give a clear view of the whole fossa navicularis, while Otis's tube will show fully six inches of the canal. By means of endoscopic tubes longer than those of Otis the

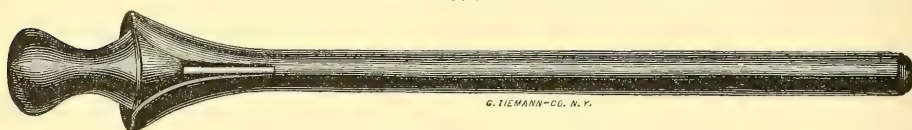
FIG. 69.



Weir's meatoscope.

urethra as far down as the beginning of the membranous portion can be inspected. Weir's instrument (Fig. 69) is made of hard rubber, and by

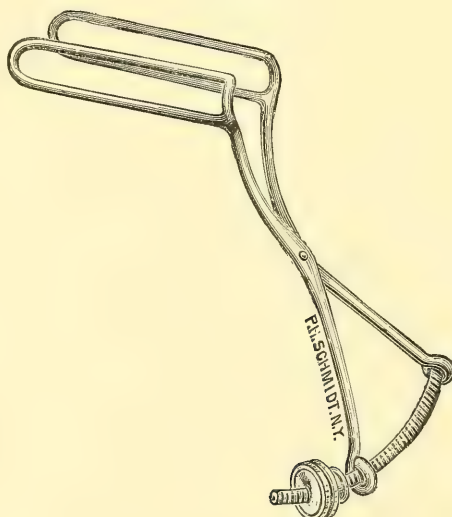
FIG. 70.



Otis's endoscopic tube.

it fully two inches of the canal can be inspected. Otis's instrument (Fig. 70) is of similar structure.

FIG. 71.

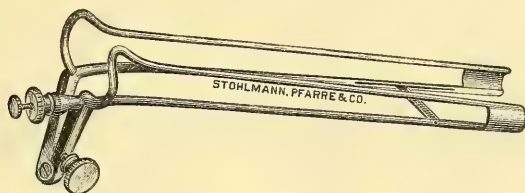


Urethral speculum.

Endoscopic tubes being solid, and not fenestrated, only admit of inspection of the urethra at their distal ends. For examination of the

fossa navicularis (for follicular abscesses and sinuses, suspected incipient gonorrhœa, chancroids, and exceptionally for hard chancres) the little speculum designed by me (Fig. 71) will often give material aid. For a close inspection of the urethral walls for about six inches the speculum of F. T. Brown (Fig. 72) may be satisfactorily employed. Care must

FIG. 72.

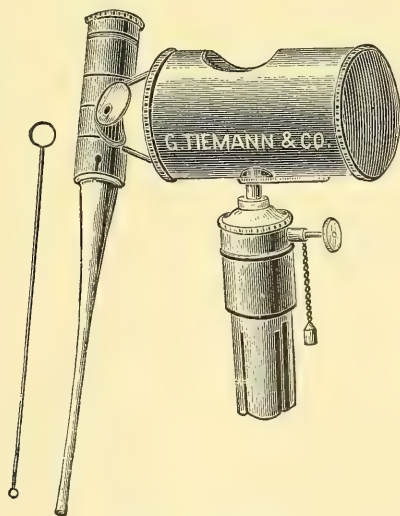


Brown's wire urethral speculum.

be exercised in using these two-bladed specula that harm is not done. It is always well to first examine and familiarize one's self with the appearances of the normal urethra, since by this course the study of abnormal conditions is rendered much easier and clearer.

It would be a waste of space to give a description of the various endoscopes which have been invented. The Mathieu endoscope (Fig. 73), a very excellent one, will give a clear view of the canal, but will

FIG. 73.



Mathieu's endoscope.

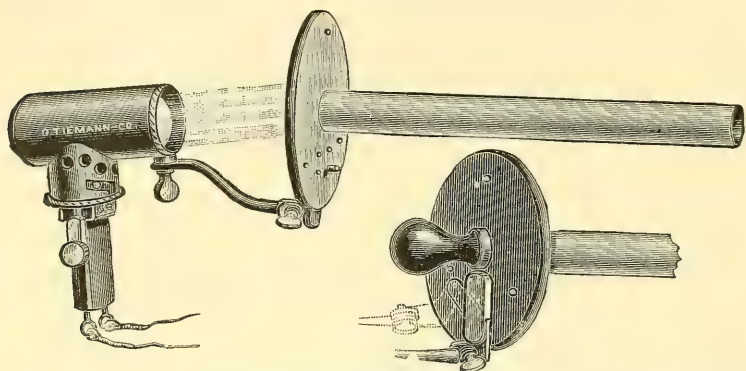
not permit of synchronous examination and topical applications. By its use, however, one may obtain much knowledge of the morbid appearances of the urethra.

The simplest of the elaborate instruments, both as to construction and use, is the perfected endoscope of W. K. Otis. By its means not



only is the canal rendered perfectly visible, but under the eye direct topical applications may be made. Since the inventor can always describe his own instrument more clearly than another man, I quote Dr. Otis's words: "This instrument consists of a metal tube or cylinder an inch and a quarter in length by half an inch in diameter,

FIG. 74.



W. K. Otis's "perfected" urethroscope.

closed at one end. A quarter of an inch from the open end of this tube is a plano-convex lens, so arranged that it may be easily removed for cleaning. On the inferior surface, near the closed end of the tube, an elbow is let in, a quarter of an inch in length and half an inch in diameter, through which the source of illumination (a small incandescent electric lamp) is introduced, a row of holes being bored at its base to allow of ventilation. The handle of the instrument consists of a piece of hard rubber an inch long by half an inch wide, the electrical connections running through it to the lamp, which is placed on top. This handle fits into the elbow by means of a bayonet joint, bringing the lamp immediately behind the plane side of the lens. A thumb-screw 'switch' in the handle places the lamp under control, so that it may be turned on or off at pleasure.

"The instrument is attached to the urethroscopic tube by means of a stout wire an inch and a half in length, with hinged joints at each end, which swing in opposite directions and are furnished with set screws, thus allowing the instrument to be put in any position, though when once adjusted it will rarely be necessary to move it. If the ordinary form of tube is used, the distal end is provided with a simple ring sliding joint; but . . . I greatly favor the use of the tube of Dr. Klotz. I have arranged the instrument for this form of tube.

"When the instrument is in position and the lamp illuminated, a strong beam of light is thrown down the urethroscopic tube, and the urethral mucous membrane is more easily and clearly observed than with any other form of urethroscope with which I am familiar.

"The advantages of this instrument are—

"1. The exclusion of all extraneous light, the presence of which is a most annoying fault both in the urethroscope of Leiter and in my own improvement on it.

"2. A very much more ready access to the urethral field, both to the eye and for instrumental applications.

"3. Increased illumination.

"4. By abandoning the funnel and sliding joint an inch and a half in distance is gained from the source of illumination to the distal end of the urethroscopic tube, increasing the illumination and allowing the eye to be placed just so much nearer the mucous membrane to be examined.

"5. Its extreme compactness and lightness, weighing *less than one ounce*, even when constructed of brass.

"6. Its great simplicity, which should ensure a moderate cost."<sup>1</sup>

A six-cell electric-light battery answers all purposes.

We have already considered the features offered by urethræ (see page 170) the seat of a chronic gonorrhœal process, and therefore need but to allude to them now. In some cases the discharge depends on a simple red spot of inflammation with infiltration, which may be limited or quite spread out. A velvety or granular condition is not uncommonly seen, while spots of follicular inflammation are not uncommon. Erosions and superficial ulcerations are commonly encountered, and with the latter lesions there is frequently a hyperplasia of the epithelial strata. Papillomatous urethritis will be encountered in various degrees of development. Sometimes the little new growths of vessels, connective tissue, and epithelium are of the size of millet-seeds, and they may reach the dignity of true vegetations. Dr. Briggs<sup>2</sup> has described and figured some of these lesions taken from an illustrative case, and has given a drawing of their microscopic structure. Polypoid growths are somewhat rarely encountered, even of such a size as to materially obstruct the lumen of the urethral canal. Dr. H. Goldenberg<sup>3</sup> has written instructively upon some personal cases in which these growths were found. He also depicts their histological structure.

The applications suitable for endoscopic treatment are, in the main, solutions of nitrate of silver, 5 : 10 to 100 of water. These should be applied by means of swab-holders or applicators carrying a tuft of absorbent cotton moistened in the medicated fluid. Strong solutions of sulphate of copper, 5 : 20–100, may be used, and in some cases such severe remedies as solution of perchloride of iron, liquor hydrargyri per-nitratiss, or Lugol's solution, may, of necessity, be resorted to. These latter solutions should always be applied sparingly and only on the morbid surfaces. Papillomatous urethritis may require operative measures if the little growths cannot be scooped off with the end of the endoscopic tube. They, with polypoid growths, may sometimes be removed by tampon écrasement, which means the introduction of a plug of cotton on the end of an applicator, which is pushed forward and backward and rotated from side to side until the growth is detached. After this a strong nitrate-of-silver application should be made. In some cases the urethral-polypus forceps may be employed.<sup>4</sup>

<sup>1</sup> *N. Y. Med. Journal*, Dec. 17, 1892.

<sup>2</sup> *Boston Med. and Surg. Journal*, Oct. 24, 1889, pp. 403 et seq.

<sup>3</sup> *N. Y. Med. Journal*, May 9, 1891 (with bibliography), and *Med. Record*, Nov. 4, 1891.

<sup>4</sup> The reader is further referred to the elaborate works of Oberländer, *Lehrbuch der Urethroscopie*, Leipzig, 1893; of Grünfeld, *Die Endoskopie der Harnröhre und Blase*, Stuttgart, 1887; of Berkeley Hill, *On Chronic Urethritis*, London, 1890; of Horteloup, *Leçons*

## CHAPTER XIV.

## URETHRO-CYSTITIS AND CYSTITIS.

UNTIL within the past few years posterior urethritis, acute and chronic, was described as cystitis, which was said to be a frequent complication of gonorrhœa. To-day we have very clear ideas as to the nature and course of posterior urethritis, acute and chronic (see sections on these subjects), and we know positively that in very many cases of these troubles there is no involvement of the bladder whatever, the phlegmasia being quite sharply united to the membranous and prostatic urethra.

The inflammatory process, however, may invade the bladder in part or in totality. In the majority of cases only that portion of the bladder near the internal sphincter, particularly on its sides and also at the base or trigone, is attacked. This limited bladder-inflammation, together with the posterior urethritis, constitutes what Finger very properly calls "urethro-cystitis."

This limited process, however, may extend, and in time involve the whole bladder, in which event there is a true cystitis resulting from gonorrhœal inflammation.

The **pathology** of gonorrhœal cystitis is not yet clearly demonstrated. In acute cases of posterior urethritis the pus quite commonly contains the gonococcus, but as the process grows old this microbe disappears and other forms of cocci seem to take its place. This same condition is observed in the pus of urethro-cystitis and of cystitis, in the secretions of which it is impossible to find the gonococcus, except very rarely in very small numbers, but which show very plainly myriads of cocci and bacteria. Much study is necessary to clear up this interesting subject. The theory of a mixed infection being the cause of this trouble suggests itself, but it cannot, as yet, be strongly urged.

Urethro-cystitis may be acute or chronic. When the inflammation is still acute, and that portion of the bladder near its neck becomes swollen and red and secretes pus, the symptoms are those of acute posterior urethritis. (See section on that subject.) These are mostly tenesmus, pain at the end of micturition, and perhaps hæmaturia. Examination of the urine shows opacity in the two cylinders, but instead of the second specimen being less cloudy than the first, as is the case in posterior urethritis, it is as cloudy, and even may be more cloudy, than the first. In some cases, but not in all, if the patient urinates into three glasses, the urine in the first, which clears out the posterior urethra, will be very cloudy, the second specimen less so, while the contents of the third glass, which come directly from the inflamed viscus in a state of tonic contraction, will be very cloudy, owing to the forcible extrusion of pus from the texture of the mucous membrane. If hemor-

*sur l'Urétrite chronique*, Paris, 1892; and to articles by Klotz, *N. Y. Med. Journal*, Nov. 27, 1886, and January 28, 1895, and to the monograph of Burckhardt, *Beitr. zur klin. Chir.*, Tübingen, 1889-90, vol. i. pp. 261 et seq.



rhage is small, only the third portion will contain blood, but if it is copious, all three specimens will contain it.

The urine is usually of acid reaction, and presents a milky or kerosene-oil-like appearance, according as the morbid process is mild and superficial or severe and deep-seated. Whenever the tenesmus is great, albumin may be present. Alkalinity of the urine may be caused by hæmaturia. When allowed to stand, as a rule the tissue-products do not settle promptly; hence fully twenty-four hours may elapse before the pus, epithelium, and mucus have settled to the bottom of the cylinder. Then we see a grayish granular and quite thick layer, in which are pus-cells and bladder-epithelium; if hæmaturia exists, there is a red layer of blood over this, and floating, cloud-like, over all is the readily movable mucous layer.

Microscopical examination of the urine of urethro-cystitis shows a conglomeration of tissue-products. The various forms of epithelial cells derived from the posterior urethra will be found inextricably mixed with the large flat bladder-epithelium. These, with pus-cells, mucous corpuscles (perhaps a few gonococci), many and varied cocci and bacteria, and blood-corpuscles cover the whole field. When decomposition of the urine has occurred, it emits a foul odor, and contains, besides the foregoing elements, triple phosphates and myriads of bacteria.

Cystoscopic examination in cases of acute urethro-cystitis shows a redness and swelling of the prostatic urethra and a thickened and quite uniformly deep-red, velvety appearance of the portion of the bladder-walls involved. The vessels sometimes show very distinctly an arborescent interlacing which is well marked.

Besides the prompt and acute invasion of the lower part of the bladder from the posterior urethra which has just been considered, there is a subacute and chronic form which is equally as common.

Subacute urethro-cystitis may develop as a result of an exacerbation of chronic posterior urethritis. When this occurs, it is usually as a result of sexual and alcoholic excesses, great physical strain, particularly in horseback riding, wrestling, and bicycling. Exposure to cold in the various ways incident to daily life is also productive of this extension. In some cases long delay in urination, and in others the introduction of catheters or sounds, have caused the phlegmasia to spread from its urethral seat to the bladder-walls.

In these cases of chronic urethro-cystitis the **symptoms** are similar, but less pronounced than in the acute form. As the chronicity of the case increases, the tenesmus, and other symptoms may grow much less and in some chronic cases cease to exist. In some cases of first attack, as well as in relapses later in the declining stage, patients complain of a dull and uneasy sensation long after urination, and they speak of a feeling as if the bladder yet contained urine. The catheter being passed, half an ounce to an ounce, or even more, of urine flows out. In these cases, owing to the swelling in the mucous membrane and its subjacent connective tissue, the bladder is unable to expel all the urine. This uneasy sensation is in marked contrast with the sharp, sometimes radiating, pains felt at the end of urination. It is a symptom of residual urine. As a result of the chronic inflammation, in some rare cases around and near the bladder-neck, a villous condition of

the mucous membrane, as shown by a quite thickened and velvety appearance, is produced, which gives rise to hæmaturia, particularly at the end of urination. In some of these cases the existence of a bladder-tumor might very properly be suspected.

Acute cystitis—meaning inflammation of the whole of the mucous membrane of the bladder—is a very rare complication of gonorrhœa, since acute posterior urethritis, even when it invades the bladder, usually only involves an inch or two, or perhaps more, of tissue near the internal sphincter. Very exceptionally the phlegmasia extends and involves the totality of the mucous membrane. In these cases the symptoms are still those of acute posterior urethritis, besides which there may be pain over the symphysis pubis, malaise, and fever. The urine is very opaque and contains bladder-epithelium, pus, and bacteria.

When the urine is tested in these cases, the second and third specimens are even cloudier than the first. In the early stages the urine is acid and has no foul smell; later it may be alkaline and offensive.

This form of cystitis may end in one or two months, but there is a marked tendency in these cases for the process to become subacute and chronic. Chronic gonorrhœal cystitis is a very persistent affection, and often resists the most intelligent treatment directed against it. Usually, with the involvement of the whole bladder, the symptoms of posterior urethritis cease, except perhaps that a little increased frequency of urination remains. In the older cases we frequently hear patients complain of a burning or scalding pain on urination, with uneasiness sometimes amounting to a paroxysm of pain at the end of the act. Urination may be quite or very frequent both during the day and the night. With the continuance of the cystitis, the morbid process, which at first was superficial, involves the deeper parts of the mucous membrane, and forms what is called “parenchymatous cystitis.” Progressing farther, ulceration of the bladder may result or the morbid process may extend up the ureters and involve the kidney and its pelvis. In cases of chronic parenchymatous cystitis the urine is usually alkaline, and has a very foul, even feculent, smell.

The **diagnosis** of gonorrhœal cystitis is to be made by a study of the history of the case and of its symptoms, together with examination of the urine. The history and symptoms have already been fully given. The urine varies according to the severity and chronicity of the cystitis. It may be simply purulent urine of acid reaction or alkaline and fetid. The three-glass test will show cloudiness in each specimen, more particularly in the last. In this connection it is important to remember that alkaline urine from phosphates, carbonates, and urates very commonly has the cloudy look of purulent urine, but its nature is soon revealed by the simple method recommended by Ultzmann. If the cloudiness is due to urates or uric acid, it vanishes by the use of heat. If it is due to phosphates, carbonates, or pus, heat increases the turbidity, but a few drops of acetic acid will clear up phosphaturia and carbonuria (the latter with much effervescence), while, if the opacity then remains, it is caused by pus or bacteria.

In all cases the microscope should be constantly used in the examination of the urine, and the following features will generally be found reliable guides in diagnosis: If the cystitis is still rather young and the

urine is still acid, on its examination various forms of urethral epithelium, bladder-epithelium, and pus will be discovered. This combination, the history being in accord, will usually warrant a diagnosis of urethrocystitis, partial or general. When the process is old and the urine alkaline, and, as it then usually is, of foul smell, withered-up pus-cells, bladder-epithelium, and triple phosphate will dominate the field and establish the diagnosis. The absence of casts and renal epithelium will show that the morbid process is still confined to the bladder.

**Treatment.**—In acute urethro-cystitis and cystitis the patient should at once assume the recumbent position. A plain, bland diet of bread and milk, and rice and Indian meal with milk, should be ordered. The bowels should at once be acted upon and kept mildly relaxed. Pain may be relieved by suppositories or by opium by the mouth or morphine by hypodermic injection. If there is much suprapubic pain, an ice-bag may be applied and kept on if it affords comfort. In some cases a hot-water bag or hot flaxseed poultice will be indicated. Hot sitz-baths and full hot baths may give comfort.

In the very acute stage all treatment by injections should be stopped.

The older practitioners placed much reliance upon flaxseed and slippery-elm tea, taken quite hot and copiously. They are certainly very acceptable to many patients, particularly if sweetened a little and flavored with a little lemon- or orange-peel. They undoubtedly act in a beneficial manner in diluting the urine. Infusions of buchu and of uva-ursi sometimes seem beneficial. The fluid extract of *triticum repens* and of *kava-kava* also may be used, either alone or in combination. Thirty drops of each in plenty of water, with two or three drops of laudanum when the pain is severe, may be given every three or four hours. When opium in any form is administered, the condition of the bowels must be carefully looked after and constipation avoided, either by the use of enemata or of aperients or cathartics.

In some cases alkalies produce a soothing effect. Bicarbonate of potassa and citrate of potassa in thirty-grain doses, dissolved in water or carbonic water, may be given three times a day. With the decline of the acute and the onset of the subacute or chronic stage the use of antiblennorrhagics, cubebs, copaiba, and oil of santal, may be of signal service in some cases, whereas in others they may cause actual discomfort. Their effect, then, should be carefully watched, and if they give decided relief they may be continued; if not, discarded. Injections into the bladder of warm solutions of boracic acid and of Thiersch's mild solution may give comfort to the patient.

In the subacute and chronic stages the most reliance is to be placed on the action of solutions of nitrate of silver, used at first very weak and increased as the treatment is continued. In many cases much benefit follows the injection into the posterior urethra of a hand-syringeful of a warm solution of nitrate of silver (1:16,000, and as strong as 1:4000). This agent irrigates the posterior urethra and passes into the bladder, the lower part of which it acts favorably upon. It may be retained for half an hour, and then voided, and as it passes out it again favorably affects the morbid surfaces. Such an irrigation may be made daily, but the sensations of the patient must be the guide in deciding its frequency. As the case progresses the strength of the solution



should be cautiously increased, until toward the last instillations of a stronger solution of nitrate of silver (see Treatment of Posterior Urethritis) are resorted to.

Solutions of permanganate of potassa (gr. j to warm water  $\bar{3}vj$  to  $\bar{3}vij$ ) also produce good results in some cases. Resorcin (gr. xlv-lxxv to water  $\bar{3}ij$ ) may also be injected into the bladder, as recommended by Finger.

Chronic cystitis from gonorrhœa is usually found in young and middle-aged patients. Cystitis from stricture and hypertrophy of the prostate is usually found in more advanced subjects.

The diagnosis being made, and the absence of stricture being determined, general and local treatment should be instituted. The diet must be regulated and be confined to bland, easily-digestible articles. Coffee, spices, beer, alcoholics, are to be interdicted. As much bodily quiet and ease as possible should be observed. In these cases care must be exercised in the use of alkalies, which some physicians seem by instinct to prescribe indiscriminately. The tendency is toward alkalinity of the urine, therefore we should be on our guard.

When the urine is alkaline, dilute nitric acid, dilute nitro-muriatic acid, and dilute muriatic acid may produce decided benefit. Salol, salicylate of sodium, benzoic acid, and salicine may be of benefit in tending to restore an aseptic condition of the bladder, which is the chief aim of treatment.

Warm injections of boric-acid-water, of Thiersch's mild solution, and of borax and water, to all of which a little laudanum may be added, may be of benefit for a time. Then the indications are for the use of more decidedly active injections, such as nitrate of silver, permanganate of potassa, and in some cases of alum and sulphate of zinc in combination. The strength of these solutions should be adapted to the case, and their action should be carefully watched. In some cases benefit follows the injection of solutions of bichloride of mercury. It is well to begin with the strength of 1 part to 30,000, and increase if progress is made, or desist if a feeling of discomfort is produced.

These cases are frequently very trying to the patient and to the surgeon, whose therapeutic armamentarium they sorely tax.

As a last resort, perineal section should be performed and the bladder washed out and drained. Boric solutions and Thiersch's solution may then effect a cure, but it may be necessary to resort to nitrate of silver, permanganate of potassa, or bichloride of mercury.

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## CHAPTER XV.

## MEMBRANOUS DESQUAMATIVE URETHRITIS.

UNDER the foregoing title a number of cases have been described in which patients have passed membranous flakes or cylinders or casts from their urethræ. In the cases thus far reported we find a marked variation in the character of the membranes and in the subjective and objective symptoms of the patient passing them.

Grünfeld<sup>1</sup> by means of the endoscope found that in the anterior and posterior urethra the walls were covered with grayish-white strips of membrane parallel with the long axis of the canal. He sometimes found casts of the urethra, but only in the anterior portion. The cases examined were those of acute gonorrhœa. In like manner Róna<sup>2</sup> saw in two cases of acute gonorrhœa some whitish layers of tough membrane, which under the microscope showed the elements of croupous membrane. In these cases the fossa navicularis alone was involved.

These cases, therefore, are illustrative of croupous inflammation occurring in acute gonorrhœa, and limited to the fossa navicularis and to the anterior and posterior urethra. In all acute gonorrhœas there is more or less croupous exudation, which passes out as detritus in the pus.

Zeissl<sup>3</sup> reports a case in which flakes and cylinders one and a half inches long were passed from the urethra of a patient who suffered from violent pain in the perineum. The author considered the case to be one of croupous inflammation in a chronic catarrhal process caused probably by strong injections.

Oberländer describes an inflammation of the urethra in which small layers of a croupous membrane are found. The affection is subacute in character and unattended with pain. These flakes may be thrown off for many months. They gradually grow thinner in structure, and finally disappear. Oberländer thinks that this urethral inflammation is similar to that seen in the mouth and called "leukoplakia buccalis."

Zeissl's and Oberländer's observations go to show that there is a chronic form of desquamative croupous urethritis.

Two very interesting cases have been reported by Pajor,<sup>4</sup> in which patients suffering from chronic gonorrhœa and certain peculiar nervous phenomena passed true epithelial tubes and flakes from the urethra.

The first case was that of a soldier who had gonorrhœa at nineteen, which was followed by orchitis, pollutions, and cystitis. Nine years later he suffered from neurasthenia sexualis, pollutions, burning in the perineum, and itching in the anus, anæsthesia of the right half of the penis, and trembling of the muscles of the neck and extremities, and general prostration. Endoscopic examination showed that the mucous membrane was hard and rough from the prostatic urethra to the fossa

<sup>1</sup> *Die Endoscopie der Harnröhre und Blase*, 1881, p. 120.

<sup>2</sup> "Adatok a buja-sbörbetegs," *Orvosi hetilap.*, 1884.

<sup>3</sup> *Zeitschrift der Gesellschaft der Aerzte*, Wien, 1852, i., quoted by Pajor.

<sup>4</sup> "Urethritis membranacea Desquamativa," *Archiv für Derm. and Syph.*, 1889, pp. 3 et seq.

navicularis, so the surface was touched with a 1 per cent. tincture of iodine. Two such applications seemed to give the patient relief. He then passed a fine milk-white membranous tube about four inches long, resembling the delicate inner membrane of an egg. Fine folds or creases ran both longitudinally and laterally in this membrane, and gave it the appearance of a snake's skin. This patient passed other shreds, but was soon cured by the local treatment both of his urethral trouble and of the various other morbid phenomena mentioned.

In the second case the man had suffered for ten years with chronic gonorrhœa, and he entered the hospital complaining of frequent strangury, pain in the urethra running to the groins, and a profuse grayish-white discharge. The endoscope showed that the mucous membrane of the urethra, from the membranous division to the middle of the pendulous portion, was of a whitish color. Applications were made of tincture of iodine, nitrate of silver, and lead-water. A few days later the patient passed a similar membrane to that of the preceding case. This was repeated three times; then the strangury and discharge ceased, and the patient was reported as improved. Histological examination of these membranes showed that they were composed of stratified pavement epithelium with large nuclei, round-cells, and wandering cells.

The points of interest to be emphasized in these cases of Pajor are the peculiar symptoms and the formation of true epithelial cylinders. In these cases the morbid process involved both the anterior and posterior urethra at the same time.

In the cases of Grünfeld, Róna, Zeissl, and Oberländer the urethra was involved more or less in its continuity and in regions and spots.

Though a few cases will not warrant sharply-drawn conclusions, these seem to point to the conclusion that there is a croupous urethritis and a well-defined epithelial desquamative urethritis, the one being acute, the other chronic.

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## CHAPTER XVI.

### EXTERNAL URETHRITIS, PREPUTIAL FOLLICULITIS, JUXTA-URETHRAL SINUSES, AND FOLLICULAR ABSCESES DUE TO GONORRHOEA.

UNDER the title "external urethritis" we understand several varieties of chronic inflammation which have their origin in gonorrhœa, are seated in the follicles and crypts of the external surfaces of the penis, and are of a very chronic and relapsing character.

#### Inflammation of the Preputial Follicles.

During the course of acute gonorrhœa or following such an attack we sometimes see running in the long axis of the penis, between the



two layers of the prepuce, a little line of inflammatory tissue, the end of which is usually on the free border of the prepuce or just within its mucous layer. Careful inspection will usually show that this little line ends in a minute opening of the size of a pin's head or of a pinhole, but sometimes it may not be visible except by the use of a magnifying glass. Pressure on this little blind canal usually causes a small droplet of greenish or grayish pus to exude from it. This sinus-like lesion may be only about half an inch long, and it will rarely be seen longer than an inch. The calibre of these lesions varies, since in some only a horsehair can be introduced, while in others a very thin probe passes by means of gentle manipulation. Sometimes these little tubes, which are really long abscesses, are of a deep even a dull red, but as they grow older they lose their color wholly or in part, and are then recognized by touch as small firm cords between the skin and mucous membrane. They may thus remain months, and even years, when untreated. At times they give issue to no discharge; then, again, particularly after sexual excess, they become red and a little painful, and pus may be expressed from them. These little sinus-abscesses are usually seen on the sides of the prepuce, sometimes down toward the frænum, and again on the median line corresponding to the dorsum of the penis.

This may be said to be the first form of gonorrhœal preputial folliculitis. There is, however, a second form, in all probability an intensification of the first form, in which we find a little cherry-stone-sized nodule or abscess-cavity situated between the two layers of the prepuce in about the same position as that of the first form. In some cases I have seen these little round or oval abscess-cavities have a well-marked outlet duct. In other instances the opening leads almost at once to the abscess-cavity. This lesion usually runs a chronic and uneventful course, but in some cases there are remissions and exacerbations of inflammation in greater or less degree. In many cases at their onset these little tumors are the seat of pain, heat, and swelling of the contiguous tissues. This prodromal inflammation usually subsides in a few days or in a week or two, and the affection then passes into the chronic condition above described. In short, it may be stated that in all forms of follicular inflammation about the penis the course of the disease may resemble gonorrhœa in its acute development, merging into subacute and chronic conditions.

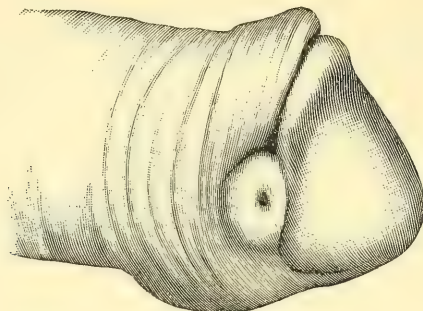
Usually there is but one follicular abscess; very rarely two are found. During the exacerbations of these chronic sinuses and abscess-cavities there is danger of auto-infection of the urethra. They may at these times also be the source of infection of women.

It is therefore a follicular abscess, which may be of conical shape or its surface may be flattened. These lesions are peculiar in the fact that they are localized and circumscribed abscesses, and are not usually attended with the diffuse spreading of the process into the connective tissue which we find in periurethral abscesses.

There is still a third form of preputial abscess. During an attack of gonorrhœa a small red spot is sometimes seen on either side of the frænum in the fossæ formed by its prominence and the folding over of the mucous layer of the prepuce where it covers the glans. This little red nodular spot soon becomes enlarged and elevated, of the size of a pea or larger, and at its apex a minute opening may be seen. An abscess of

this kind may burst and heal up, or after the pus has been discharged and the inflammation has subsided it may be again infected by the urethral discharge, and again be the seat of abscess. This process may be repeated several times. Besides this nodular lesion of the frænum

FIG. 75.



Follicular abscess of the prepuce near the frænum, due to gonorrhœa.

there is sometimes present there a tube-like or sinus-like lesion, such as is found in the prepuce. This blind sinus is affected, as the other lesions are, by varying degrees of suppuration. In some cases, after the evacuation of the pus, usually by pressure or perhaps by a slight incision, the morbid process ceases and the part again becomes healthy. In other cases, however, the abscess is very persistent and rebellious to treatment. It seemingly heals, and then only a little hard nodule of fibrous tissue seems to be left. This is usually so small that the dangers incident to its existence do not occur to a person unfamiliar with it. Then, most unexpectedly, perhaps as a result of gonorrhœa, of sexual excess, or want of cleanliness, the abscess-process occurs again. This may again seemingly pass away, and again break out anew after a short or long interval. This morbid condition may exist over a period of many years. Then, again, in some cases the nodule grows larger and deeper, and perforation of the urethra may occur, the process not being in any way chancroidal. I have seen several fistulæ thus produced, a part of the urine passing through them; and the possibility of this occurrence has taught me always to deal promptly and radically with these not-infrequently-occurring frænal abscesses and nodules. Persons having a long, tight, or a straight prepuce or one with a small orifice are the ones who suffer most from the chronicity and oftime recurrence of these little lesions. Then, again, persons who for any reason suffer from balano-posthitis or who are frequently the victims of gonorrhœa are peculiarly liable to these abscesses, with their annoying exacerbations and remissions. It is not uncommon for one of these abscesses to become active, and for its pus to infect the urethra of its bearer, without any infection in coitus.

In the present state of our knowledge it is impossible to definitely say just what structure is involved in the chronic suppurative process in the prepuce. Odmansson<sup>1</sup> thinks that they originate in closed and dilated lymph-channels which have opened upon the skin or mucous

<sup>1</sup> "Om urethritis externa, särskildt hos mannen och om cystbildningar a förhuden," *Nord. Med. Ark.*, xvii., No. 5, 1885.

membrane. He claims that he has found small lymph-crypts in the prepuce. These statements are seemingly not based on histological study, and have not been generally accepted. Careful histological studies of these preputial sinuses and abscesses have been made, in all, in five cases by Touton,<sup>1</sup> Jadassohn,<sup>2</sup> Fabry,<sup>3</sup> and Pick,<sup>4</sup> and they reach the conclusion that the structures they removed and studied were in all probability sebaceous or Tyson's glands, so altered by the morbid process that an absolutely certain opinion could not be formed. Neither of these observers thought the lesion occurred in the diverticula of the skin, the cysterna of Von Düring, or in invaginations of the epithelium. As a result of the investigations of these four observers it seems settled that an acute suppurative process is set up by the gonococcus, and that this pathogenic agent retains its virulence for a longer or shorter period. After a time, however, it disappears, and then the chronic suppurative process is kept alive by the ordinary microbes of suppuration.

### Suppuration of Follicles of the Cutaneous Investment of the Penis.

We sometimes see on the under surface of the penis, along the raphe even as far back as the scrotum, small suppurating sinuses and follicles which usually have a well-marked outlet which is directed forward toward the glans penis. Sometimes these lesions are tube-like, and again they feel like minute nodules. They may be seen in an active state, but usually they are shown to the surgeon when there is no complicating hyperæmia and only the slight discharge on pressure from the outlet duct. There is, as a rule, one such lesion, but sometimes there are two, rarely more.

The structures involved in these cases are undoubtedly sebaceous follicles, and they are usually associated with hair-follicles. Similar follicular inflammation may be found along the dorsum of the penis, on the middle line, as far as the symphysis pubis. One or more follicles may be involved. When inflamed, any of these follicular swellings may to a superficial observer look like chancre or chancroid. Jadassohn thinks that these cutaneous follicular abscesses are caused by the gonococcus. It is probable that in some cases the pyogenic microbes are the cause of them.

### Juxta-urethral Sinuses.

Not infrequently patients present themselves to the surgeon complaining of a slight but persistent discharge, which they say comes from one or both lips of the meatus. Sometimes the affected part is distinctly red, and again it may appear normal in tint. It sometimes happens that a distinct opening can be seen, and it is usually of the size of a

<sup>1</sup> "Ueber Folliculitis præputialis et paraurethralis gonorrhœica, etc.," *Archiv für Derm. und Syphilis*, vol. xxi., 1889, pp. 15 et seq., and "Weitere Beiträge zur Lehre von der Gonorrhœischen Erkrankungen der Talgdrüsen am Penis, etc.," *Berlin. klin. Wochenschrift*, No. 51, 1892, pp. 1303 et seq. These essays of Touton contain elaborate and interesting studies as to the mode of invasion of the gonococci in epithelial tissues.

<sup>2</sup> "Ueber die Gonorrhœe der Paraurethralen und Präputialen Gänge," *Deut. med. Wochenschrift*, 1890, Nos. 25 and 26.

<sup>3</sup> "Zur Frage der Gonorrhœe der Paraurethralen und Präputialen Gänge," *Monatshefte für Prakt. Derm.*, vol. xii., 1891, pp. 1 et seq.

<sup>4</sup> "Ueber ein Fall von Folliculitis Präputialis Gonorrhœica," *Verhandlungen der Deut. Dermatol. Gesellschaft zu Prag*, 1889, pp. 253 et seq.

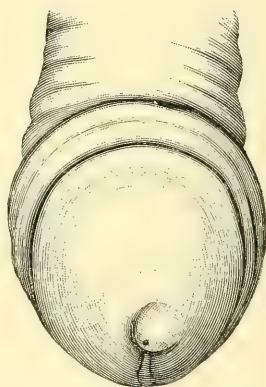


pin's head or of a pinhole. Very often this opening is hidden in the uneven papillary surface of the meatus, and the use of a magnifying glass is required to make it clearly visible. Usually pressure on the glans, particularly in the morning, will cause a droplet of pus to exude, and thus the outlet of the sinus is revealed. Then, again, in some cases a thin, minute crust forms from escaping pus, and removal of this crust reveals the hidden orifice. These sinuses, which have been called by my friend, Dr. Otis,<sup>1</sup> "follicular sinuses," and by several "gonorrhœal folliculitis," have been studied by Diday,<sup>2</sup> Harmonic,<sup>3</sup> Campana,<sup>4</sup> Jamin,<sup>5</sup> and others. They are usually seated on one or both lips of the meatus at about a sixth or third of an inch from its inner margin. In most cases the sinus is seated in the middle of the lip of the meatus, but in some cases it opens at the posterior, and quite rarely at the anterior, commissure. There may be one or two such sinuses on one side, which are entirely distinct from each other; then, again, cases are seen in which it is probable that the two sinuses are connected. These morbid canals usually run backward parallel with the urethra, but in some cases they pass obliquely backward and inward, and open in the fossa navicularis, forming the meato-navicular fistulæ. I have seen several cases in which the opening was just within the lip of the meatus. It is not at all uncommon to find small follicular sinuses which open upon the urethra as far back as an inch from the meatus.

These little lesions may exist for years, giving issue to a slight discharge and causing no uneasiness of mind or body. Some patients have them and pay no heed to them; to others they are a source of worry and annoyance. In some cases we get a clear history of their onset during an attack of gonorrhœa; in others they seem to originate in balanitis and balano-posthitis. I have seen several cases in which these sinuses appeared and disappeared with each attack of gonorrhœa. As a rule, however, they remain indolent for an indefinite time, but are liable to periods of exacerbation in which they become minute but conspicuous abscesses, as may be seen by inspection of Fig. 76. The introduction of a minute probe shows that these sinuses vary in length from one-third to one-half an inch, and, very exceptionally, a little longer.

It sometimes happens that these follicular lesions of the meatus appear at the same time that those of the frænum do. This is well shown in a

FIG. 76.



Juxta-urethral sinus during a period of exacerbation.

<sup>1</sup> *Stricture of the Male Urethra, etc.*, New York, 1878, pp. 9 et seq.

<sup>2</sup> "De la Blennorrhagie des Follicules muqueux du Meat. de l'Urèthre chez l'Homme," *Gaz. hebdom. de Méd. et de Chir.*, 1860, vol. vii. pp. 725 et seq.

<sup>3</sup> "Des Folliculites blennorrhagiques de l'Homme," *Annales Méd.-Chir. de Martineau*, Sept., 1883.

<sup>4</sup> "Follicolite blennorrhagica," *Gior. Ital. delle Mal. Ven. e della Pelle*, 1884, pp. 193 et seq.

<sup>5</sup> "Des Fistules juxta-urèthrales du Meat.," *Annales des Mal. des Organ. Gén.-urin.*, vol. iv., 1886, pp. 409 et seq.

case reported by Molinié,<sup>1</sup> in which there was a sinus on each lip of the meatus, and one near the frænum. All these sinuses made their appearance on the third day of an attack of acute gonorrhœa.

These suppurating canals may be the cause of auto-infection, and in some cases they may secrete gonococci-containing pus by which the female may be contaminated.

Much has been written as to the bacteriology of these juxta-urethral lesions, but true scientific knowledge concerning them is not in our possession. According to my reading and study, the case may to-day be stated as follows: It is probable that during and for some time after an attack of true gonorrhœa these sinuses give forth a gonococci-containing pus, and that in their chronic condition this secretion contains the ordinary pus-microbes. Arising as they do both during gonorrhœa and simple balano-posthitis, it is probable that in some cases they have as a morbid agent the gonococcus, and in others the ordinary pus-microbes.

No histological examinations of these sinuses have yet been made. It is probable that they originate in a persistent Tyson's gland or in a misplaced Littre's follicle.

**Treatment.**—In the treatment of the preputial follicular lesions the best course is thorough extirpation as soon as possible. If the surrounding tissues are in a state of hyperæmia, it is well by pressure or the use of the knife to let pus out, and then reduce inflammation by the use of antiseptic lotions. Usually there is such a redundancy of tissue in the prepuce that thorough removal of the morbid parts is possible without any damage to the penis. In the fossæ of the frænum, however, these lesions are sometimes imbedded deep in the tissues and are adherent to the corpus spongiosum. In such cases the curette may often be freely used to advantage. Each case will present its peculiar surgical indications, and upon these the judgment of the surgeon must be based. It is well to remember that in some cases these lesions of the frænum are kept in an active state by balano-posthitis, and that after circumcision the source of irritation ceases and the part soon gets well. Circumcision, therefore, is of benefit in some cases.

When there are two follicular abscesses, one on each side of the frænum, it will be necessary to carefully dissect them out, and perhaps at the same time remove that fibrous cord.

In some cases in the subacute stage gentle, firm pressure of the lesion once a day will express the contents, and in the end may cause healing.

Prompt and radical measures may be adopted for the cure of suppurative follicles of the integument of the penis. After careful asepsis the lesion may be incised and thoroughly curetted. It will then heal readily under antiseptic dressings.

The treatment of juxta-urethral sinuses is much more difficult. It is sometimes expedient to enlarge the sinus with a very small bistoury, and then endeavor to obtain healing from the bottom by means of stimulating injections and, if possible, a minute tampon. The ordinary hypodermic needle, blunted by the removal of its point, is very useful in the treatment of these cases. After careful cleansing and antiseptic

<sup>1</sup> "Folliculite glandulaire blennorrhagique," *Journal des Mal. Cut. et Syphil.*, March, 1893, p. 165.

a drop or two of a 3 or 4 per cent. nitrate-of-silver solution may be injected every second day. I have seen good results from the introduction of a fine probe coated with pure nitrate of silver which had previously been melted by heat.

It is important to remember that not infrequently these lesions heal spontaneously as a result of daily firm but gentle pressure; therefore it is not well to commence an active treatment until evidence of chronicity is assured.

Martineau claims that he cured many cases of follicular lesions about the penis by applying the galvano-cautery cold to the mouth of the follicle, and then suddenly turning it on to a white heat. If used at all near the meatus, great care and judgment must be exercised.

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## CHAPTER XVII.

### PERI-URETHRAL ABSCESES.

ABSCESES of medium and large size are not infrequently found upon the penis near the frænum and along the course of the organ as far back as the peno-scrotal angle. It must be borne in mind that these lesions are of greater extent and severity than those described in the preceding chapter as follicular inflammations.

Peri-urethral phlegmon or abscess near the frænum is usually a concomitant of acute gonorrhœa or it may occur in the chronic stage of that process. In some cases, in primary attacks, it appears during the height of the urethral suppuration, in others toward the period of decline, and only exceptionally in the later stage. It usually begins as a red and tender spot on one side of the frænum. This inflammatory condition may increase rapidly, and again its growth may be rather slow. In either event it is soon seen that an abscess is in process of formation. These abscesses are in general round and globular, but their shape is determined by the topographical arrangement of the frænum and the tissues forming its fossæ and the prepuce. Sometimes the tumor is round, and again it may be oval shape. In Fig. 77 an oval abscess of the left frænal fossæ is well shown. In this case the inflammatory process was very active and gave rise to œdema, which produced moderate paraphimosis.

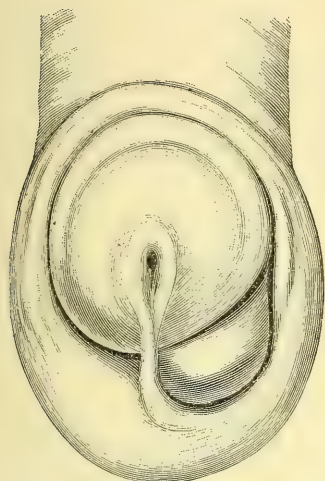
Perhaps in the majority of cases these abscesses occur unilaterally and are tolerably well circumscribed. When of goodly size the inflammatory œdema which accompanies the suppurative process may involve the tissues on the unaffected side of the penis. This is also well shown in Fig. 77.

Then, again, in somewhat exceptional cases an abscess forms in one frænal fossa, increases rapidly and extensively, and, passing under the



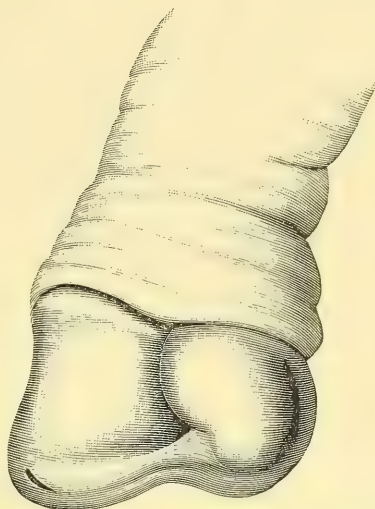
frænum, involves the other fossa in the suppurating process. This is well shown in Fig. 78, in which all the connective tissue at the under

FIG. 77.



Abscess near the frænum, producing moderate paraphimosis.

FIG. 78.



Abscess near the frænum, involving both fossæ.

part of the glans is involved in abscess-formation. The frænum then divides the abscess into two lobes.

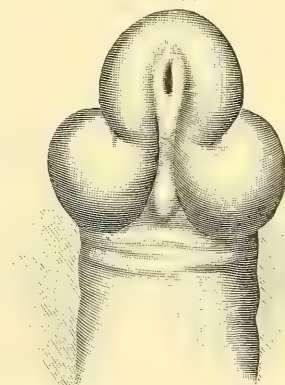
It also happens, somewhat rarely, that the tissues of each fossa of the frænum become affected separately, in which event there are two distinct abscesses. This occurrence is well shown in Fig. 79.

In any of these cases the patient experiences more or less pain at the part involved. In somewhat rare instances there is constitutional disturbance, as shown by chills, fever, and loss of appetite. The pressure of the tumor upon the urethra may affect the force and shape of the stream of urine or occasion dysuria amounting even to retention.

It is not definitely known how and where the suppurative process begins in these cases. It certainly originates in the pus of acute or chronic gonorrhœa. I have paid particular attention to this point, and as a result of careful inquiry I can say that I never saw an abscess of the frænum without there being obtainable a history of gonorrhœa more or less recent. It may be that this affection begins, as

does that described in the previous chapter (page 193), in a follicle or crypt. If that is the case, the walls of these structures are soon destroyed, and a diffuse cellular-tissue abscess is produced. Clinically,

FIG. 79.



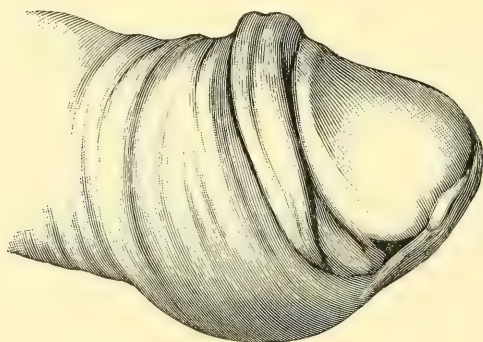
Abscess in each fossa of the frænum.

however, we have the two forms of lesions as I have described them—the one quite circumscribed and probably of follicular or cryptic origin, the other a diffuse cellular-tissue abscess, which may possibly have had its origin in an infected follicle or crypt. When incised and properly treated these abscesses may heal up promptly. In some cases, however, particularly when proper care has not been taken, the abscess-cavity contracts into a small, firm, inflammatory nodule which remains indefinitely. This inflammatory nodule sometimes redevelops into an abscess with each recurrent attack of gonorrhœa. I have seen cases in which they led to the formation of a urethral fistula.

**ABSCESSSES OF THE FOLLICLES OF THE URETHRA.**—These lesions begin as inflammatory foci either in Littre's follicles or the crypts of Morgagni. During the acute and declining stages of gonorrhœa we frequently feel with the finger-tips one or more or many little millet-seed and even larger nodules in the corpus spongiosum. These little circumscribed swellings are undoubtedly swollen follicles. In most cases, for the reason that we find gonococci in the pus coincidently with the follicular inflammation, it is fair to assume that the morbid process is caused by those microbes. Follicular inflammation occurring after the cure of gonorrhœa—a not very frequent condition—may be due to the action of other microbes, perhaps the streptococci or staphylococci. It may be stated quite positively that in most of the cases of gonorrhœic follicular inflammation resolution takes place synchronously with the cessation of the major process.

Follicular abscesses of the urethra may develop in the fossa navicularis. These suppurations are here, as a rule, not of large extent, the abscess being usually of the size of a pea. The smallness of the follicular abscess in this region is probably due to the density of the tissues and to the absence of much connective tissue. Usually, when the process is complete, pus is discharged into the urethra, and a short sinus

FIG. 80.



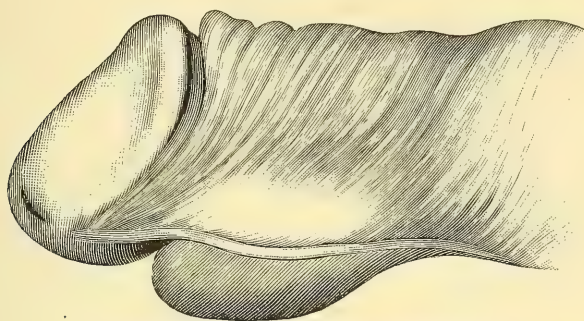
Abscess of the follicles of the urethra.

leading to a small cavity is left. This may heal of itself or may require local treatment. In somewhat rare cases the abscess of the fossa navicularis extends deeply into the tissues and opens on the outside in either fossa of the frænum. In this event there is much danger of a permanent urethral fistula. Careful treatment, aided by nature, or nature

alone, may close up the wound, but there is always a strong probability that the fistula will be permanent.

Farther down the urethral canal follicular abscesses are not at all uncommon. They begin as small, round, painful swellings, which in their early stage are easily circumscribed by the fingers. They usually

FIG. 81.

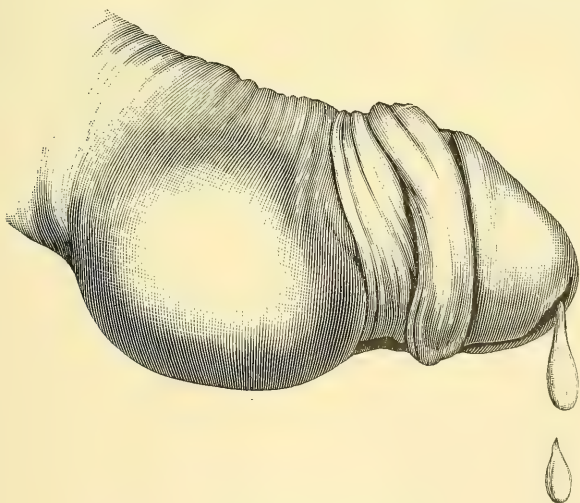


Unilateral abscess of the follicles of the urethra.

go on more or less promptly to suppuration, which is attended by much inflammatory œdema of the corpus spongiosum and the connective tissue external to it. In Fig. 80 is well shown a follicular abscess which began about one inch behind the fossa navicularis.

Occasionally the follicular abscess is seated on one side of the penis,

FIG. 82.



Large abscess of the follicles of the urethra during gonorrhœa.

though the inflammatory œdema may extend to the other side. This is well shown in Fig. 81, in which the abscess was seated about an inch and a half from the meatus. The two preceding figures (80 and 81)



will give a good general idea of the size of these lesions. But these abscesses in the pendulous portion of the penis sometimes become very large—a fact well brought out by the appearance presented by Fig. 82. It will be seen that the phlegmonous process complicated an acute attack of gonorrhœa.

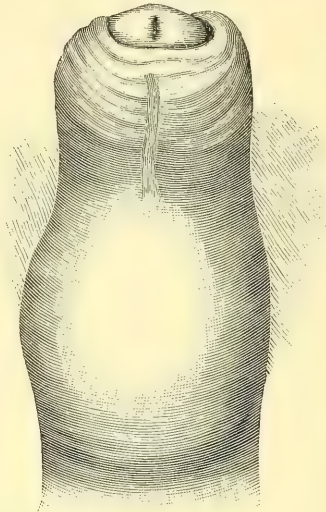
In quite rare instances the abscess increases slowly and without marked inflammatory symptoms. The swelling becomes more and more salient above the tegumentary level of the penis, until in the end a well-marked pedunculated tumor or abscess-formation is produced. This feature is clearly portrayed in Fig. 83. In this connection it may be

FIG. 83.



Chronic pedunculated abscess of urethra.

FIG. 84.

Abscess of the follicles of the urethra  
(tenth attack.)

interesting to remark that I once saw a pea-sized sebaceous tumor or wen on the under middle part of the pendulous portion of the urethra. As a result of irritation the integument over this wen was inflamed and tender, and the appearances were strikingly suggestive of follicular abscess of the penis.

The tendency to relapse observed in these follicular urethral lesions is shown in Fig. 84, in which a large swelling (the tenth of a series) of the middle of the under part of the penis is portrayed. As is common in these relapsing phlegmons, the inflammatory process was not very acute, though there was considerable suppuration.

In most of these cases of follicular suppuration of the urethra the swelling is out of all proportion to the amount of suppuration. There is, as a rule, very much inflammatory œdema, but the suppurating cavity usually contains from half a drachm to a drachm of pus. In very large phlegmons two or three drachms may be found.

There are two dangers to be looked for in these cases of follicular abscess of the urethra. The one is urethral fistula; the other is the formation, after the abscess bursts into the urethra, of an inflammatory nod-

ule. This inflammatory nodule is always a menace to the patient. It resolves itself into a little lump, in most cases easily felt, usually on the lower wall of the urethra. In this latent condition occasionally it may be so small and insignificant that it can be scarcely felt, but during erection its presence is readily made out. It may thus remain for months or years. But, as a rule, with every recurrence of gonorrhœa the suppurative process lights up again and a new abscess is formed. This may occur again and again for many years. I have seen as many as twelve recurrences of this process. In many cases in these repeated attacks the swelling is about of the same severity in each. In some cases, however, the abscess-formation becomes more intense, and pus is discharged externally through the inflamed and eroded skin. In these unfortunate cases a urethral fistula remains, which is usually permanent and requires for its relief a plastic operation. In favorable cases the inflammatory nodule undergoes contraction, and finally ends in a small cicatrix.

In many of these cases of follicular phlegmon of the urethra the morbid process is limited to the urethral wall proper, and it is in these cases, even when suppuration occurs, that resolution and cure commonly result. In the more severe cases the follicular abscess increases beyond the urethral tissue proper into the connective tissue between it and the corpus spongiosum. It may continue still farther and involve more or less or all of the corpus spongiosum. As the suppurative process thus progresses outwardly, in most cases a wise provision of Nature occurs. With the establishment of the suppurative process in the deep part of the urethral wall, or in the contiguous connective tissue, or in this and in the corpus spongiosum, an adhesive inflammation obliterates the little follicular cavity in the urethral wall, the damage is repaired, and the then outlying abscess is shut off from all communication with the urethra. This abscess then has as its base the healed urethral wall, while its sides and roof are formed by the infected tissues of the corpus spongiosum, the subcutaneous connective tissue, and the skin itself.

In some cases, unfortunately, this walling off of the abscess-cavity by adhesive inflammation does not occur, and then there is much reason for apprehension that a permanent fistula will follow the resolution of the inflammatory process. Even should urine escape in these cases, all hope need not be given up, since sometimes, most unexpectedly, healing takes place, the urethra is not left perforated, and we find at the seat of the trouble a little line or nodule of firm structure which we know is the cicatrix. When, however, the parts are well healed and a sinus remains, it may usually be looked upon as permanent, unless relieved by a plastic operation.

There is still another condition which is sometimes observed. The abscess opens into the urethra, and there is left a cavity and an internal blind fistula or sinus leading to it. In favorable cases the parts retract until the lesion ends in a little cicatricial mass. But sometimes this happy result is not attained, and the cavity and its duct remain. Then urine leaks into the wound, and slowly or quickly an abscess again forms. This may occur again and again, and may finally end in a fistula leading from the urethra to the outside. Then, again, even when abscesses have repeated themselves under these conditions many times, thorough healing may finally occur.

**ABSCESSSES OF COWPER'S GLANDS.**—These abscesses, which are not common, begin in these glands, which are seated between the two layers of the triangular ligament. They usually occur at about the same period as epididymitis, during the third or fourth week of gonorrhœa or later. Usually but one gland is affected, quite exceptionally two are involved, and in this they are similar to abscess of Bartholin's gland. The peculiarity of these abscesses is that they are seated on either side of the raphé or median line. In their early stages these phlegmons are felt as little cherry-sized round or oval swellings just at the triangular ligament. With the development of the abscess-process the patient experiences pain, uneasiness, and tension in the perineum near the bulb, which is aggravated in the sitting position, in walking, and by pressure and friction of the clothes. With the increase in the phlegmonous process the pain becomes severe, and in many cases there are chills, fever, and malaise. Owing to the swelling, the urethra is not unfrequently pressed upon, and dysuria, and even retention, may result. As the abscess increases in size it pushes outward and forms a tense red

FIG. 85.



Abscess of Cowper's gland.

swelling in the perineum, or it pushes forward and juts out at the peno-scrotal angle. While at first the swelling is seated on one side of the raphé, when it becomes very extensive it encroaches on the opposite side.



This condition is well shown in Fig. 85. When the abscess is very large, as it is somewhat rarely is, the whole perineum becomes red and swollen.

In most cases abscess of Cowper's glands is an acute process, but in some it takes place quite slowly. Usually the swelling extends from the bulb into the tissue beyond, and the abscess either opens or is opened in the perineum or in the scrotum. The further course of these abscesses is similar to that of those just described. The abscess may be walled off, and then when opened may be healed from the bottom, or the sinus leading into the urethra may remain patulous, in which case there is left a perineal or scrotal fistula. In my experience, in the majority of cases the urethral wound, which consists of the duct of the gland in a state of inflammation, heals, and no bad results are finally left. In rather exceptional cases a fistula is left.

It sometimes happens, particularly when the abscess is not very large, that it opens through the duct into the bulb, and the pus then escapes through the urethra. In this event it may happen that subsequent contraction may obliterate the abscess-cavity and its duct. Then, again, it is rather more common to find that considerable contraction occurs—that the morbid process becomes circumscribed to a nutmeg-sized or even larger mass, and this may remain indolent. This condition is always one of ill omen, since it so frequently forms a focus for the re-formation of abscesses. Thus one phlegmon after another may form and burst into the urethra over a period of many years. Sometimes this recurrence of the phlegmonous process is lighted up by fresh attacks of gonorrhœa or by exacerbations of a chronic gonorrhœal process. Then, again, in many instances the new suppuration is seemingly due to the leakage of urine into the inflamed nodule.

Quite rarely still another course may be taken by the Cowper's-gland abscess. In the original inflammation there may be considerable œdematous hyperplasia of the gland and tissues immediately surrounding it, and some pus may be formed, but the whole abscess-swelling is of a subacute character, and less in size than a walnut. After the escape of the pus a nodule is left, which for a time may or may not remain quiescent. Then it gradually grows, and a firm somewhat painful swelling, without much redness, appears in the perineum. This swelling, which is for a long time on one side of the raphé, increases very slowly, occupying two and even many months in its course. It presents a hard, firm structure, and fluctuation cannot be detected for a long time. Finally, the necessity for opening the abscess becomes evident, pus escapes, and usually a fistula leading to the bulbous urethra is left. But even in these cold chronic abscesses the walling off of the suppurative process may occur and no fistula may be left.

In all probability, abscesses of Cowper's glands begin originally by infection from gonococcus-invasion. Pellizzari<sup>1</sup> cautiously collected the pus of three peri-urethral abscesses, and in it found the gonococcus. In three hospital cases of Cowper's-gland abscesses, every precaution against contamination having been exercised, in all specimens of the pus the gonococcus in sparing quantity was found by me.

**Treatment.**—All these forms of abscess should be treated on general

<sup>1</sup> "Il Diplococco di Neisser negli ascessi blennorrhagici peri-urethrali," *Giornale Ital. delle Mal. Ven. e della Pelle*, 1890, pp. 134 et seq.

surgical lines. Until the suppurative process is ripe it is well to apply cooling lead-and-opium or muriate-of-ammonia or carbolic lotions. When fluctuation is felt, a good, liberal, but careful incision should be made, and the abscess-cavity should be thoroughly cleansed with a bichloride solution or irrigation with carbolic water. Then the wound should be dressed with iodoform or aristol and stuffed with gauze. In the event of a fistula being left leading into the urethra, it will be necessary to resort to a plastic operation when the inflammation has fully subsided.

In cases of abscess of Cowper's glands it is not well to be too prompt in operating. In these cases poultices do much harm by causing a spread of the inflammatory œdema. The best plan of treatment in the developing stage of this abscess is to keep the parts well covered with absorbent cotton saturated with lead-and-opium wash or with a 2 per cent. carbolic-acid watery solution. It should always be remembered that sometimes these abscesses, even when they have attained the size of a large walnut, may gradually undergo retrogression and finally disappear. The best rule for guidance is to watch the case carefully, and as soon as fluctuation is well made out to incise the parts freely, and then irrigate and dress the wound antiseptically. In most cases the abscess does not perforate the urethra, and healing promptly occurs. When there is a fistula into the urethra, the parts may often be healed and their integrity restored by careful and methodical packing of the wound from the bottom. In these somewhat deep wounds balsam-of-Peru gauze is often very beneficial.

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## CHAPTER XVIII.

### GONORRHOEA OF THE RECTUM.

WITHIN the past few years our knowledge of this subject has been much increased and has been made more precise. So many well-authenticated cases of gonorrhœa of the rectum have been reported that no doubts are now entertained as to the susceptibility of this gut to the irritation of gonorrhœal pus and to the occurrence of a resulting specific suppurative process in it. It is an affection more or less frequently observed in countries in which sodomy is practised, but instances of it are not frequent in the United States. I have seen, in all, three well-marked cases, and in the discharge from one (a recent case) I found gonococci.

Much of the literature of this subject is unsatisfactory; therefore I shall merely mention some of the cases reported within a few years:

Thiry<sup>1</sup> reports the case of a woman, aged twenty-four, who suffered from weight and shooting pains in the pelvis, pain in defecation, and a

<sup>1</sup> "Rectite blennorrhagique, et cet.," *Presse Méd.*, Belge, 1882, xxiv. pp. 201-203.

constant thick discharge from the rectum. She had a funnel-shaped anus, the folds of which were obliterated, and the sphincter was weak and dilated. The lower portion of the rectum was acutely inflamed and studded with bright-red points which bled freely. The follicles were enlarged and from them pus escaped. The woman confessed to sodomy with men suffering with gonorrhœa.

Winslow<sup>1</sup> reports an epidemic of gonorrhœa in a Baltimore institution for boys from nine to twenty-one years old, which originated in the following manner: A boy who was on leave of absence contracted gonorrhœa from a girl, and was suffering from it on his return to his duties. Before he was cured he had anal coitus with another boy, who from it became infected. From this boy with rectal gonorrhœa many other boys contracted the disease. Ten such cases are recorded, and it is stated that it was probable that there were other cases which were not reported.

The most satisfactory case is that of Frisch.<sup>2</sup> It was of a girl seventeen years old who, fifteen days after unnatural intercourse, complained of burning pain in the rectum, particularly during defecation. The peri-anal region was reddened and excoriated, and from the anus, narrowed by inflammation, a thick greenish-yellow pus escaped. In this secretion and in that from the genitals myriads of gonococci were found.

Tuttle<sup>3</sup> reports two cases of rectal gonorrhœa in men and one in a woman due to sodomy, in the secretions of all of which gonococci were found.

Cases of women suffering from rectal gonorrhœa in which the gonococcus has been found have been reported by Neisser and Bumm. Cases of auto-infection with rectal gonorrhœa have also been reported. Rollet<sup>4</sup> reports the case of a man suffering from gonorrhœa who was also affected with constipation. It was his custom to aid defecation by introducing his finger into the rectum. By this manœuvre his finger, being soiled with pus from his urethra, infected that organ. Dock<sup>5</sup> reports a case of urethral inflammation in a male twenty-five years old, which, as regards its gonorrhœal nature, is not quite satisfactory, but which presented a typical clinical picture of gonorrhœa of the rectum. In this case infection is supposed to have occurred by means of a finger soiled with gonorrhœal pus which was introduced into the rectum for the insertion of suppositories. Careful microscopical examination showed the presence of gonococci.

**Etiology.**—It will be seen from a consideration of the foregoing cases that a virulent proctitis is not uncommonly met with, due to infection with gonococci-containing pus. In most of the cases the infection occurs as the result of sodomy, more frequently in women and young boys, but also in older males, the active agent suffering at the time from

<sup>1</sup> "Report of an Epidemic of Gonorrhœa contracted from Rectal Coition," *Med. News*, Aug. 14, 1886.

<sup>2</sup> "Ueber gonorrhœa rectalis," *Verhandl. der Phys.-med. Gesellsch. zu Würzburg*, 1891–92, N. R., pp. 167 et seq.

<sup>3</sup> "Gonorrhœa of the Rectum," *N. Y. Med. Journal*, April 3, 1892, p. 379.

<sup>4</sup> *Dictionnaire encyclop. des Sciences méd.*, art. "Anus (Maladies vénériennes de l'Anus)," 1870, p. 495.

<sup>5</sup> "Gonorrhœa of the Rectum," *Medical News*, March 25, 1893, p. 325.



gonorrhœa. In some cases the gonorrhœal pus is carried to the rectum by means of a soiled finger. It is claimed that in acute gonorrhœa in women the pus, escaping from the genitals, may infect the anus and rectum. This accident is, of course, possible, but as a broad general rule it may be stated that rectal gonorrhœa results from the intromission of an organ secreting or soiled with virulent pus.

**Symptoms.**—The first symptom of gonorrhœa of the rectum is an uneasy sensation, attended with more or less heat. This may be complained of within from two to ten days after contamination. Heat and burning increase, defecation becomes painful and often more frequent, and soon a discharge is noticed which may at first be watery or milky, but which promptly becomes purulent and even streaked or mixed with blood. At this time burning heat and itching are felt in the anus, which becomes red and swollen, and a deep dull, aching pain in the rectum is felt. Defecation becomes more and more painful, and sometimes is so severe as to be agonizing. Frequent calls to stool keep the patient in a condition of apprehension and suffering. The purulent and bloody secretions often become offensive in smell, and ooze constantly from the inflamed and relaxed anal orifice. In well-marked cases decided constitutional reaction is observed at the end of a few days or a week. The patient looks haggard and worried, there is some rise in temperature, the pulse is rapid and small, and general malaise and debility are experienced. This condition may last one to three weeks, when amelioration is experienced.

In many cases this affection is not attended with the severe symptoms above described, and it ceases gradually under simple treatment. The milder cases are usually those in which the anal region alone is involved; in the more severe and intractable cases the lower part of the rectum is the seat of inflammation.

The objective symptoms of gonorrhœa of the rectum and anus are striking. The mucous membrane becomes red and swollen, and in patches excoriated and ulcerated, with here and there red mammillations corresponding to inflamed follicles; a foul, tenacious pus bathes the rectal walls and escapes from the anal ring, which is thickened, reddened, excoriated, and perhaps the seat of several small- or good-sized fissures. In some cases fleshy tabs are developed, presenting the appearance of hemorrhoids, while in others, particularly those in which treatment has not been followed, simple vegetations may develop. In passive pederasts and sodomists the anus is frequently of a decided funnel shape, its folds are more or less obliterated, and the tonicity of the sphincter is decidedly impaired.

**Diagnosis.**—It is frequently difficult to determine positively the gonorrhœal nature of a suppurating rectal inflammation. In some cases the history or concomitant circumstances point to a gonorrhœal origin. Very many patients will, from motives of shame, deny any unnatural practice and will endeavor in every way to mislead the physician. Others, again, will, with barefaced candor, promptly admit the shameful mode of origin of their trouble. In women suffering synchronously from purulent discharge from the vagina, urethra, or vulva the diagnosis is often easy. As a rule, the severity and persistency of a rectal or anal suppurating process will excite the suspicions of the physician. Then, again, the

sudden onset and quick, prompt development of rectal gonorrhœa (the facts of which can generally be obtained without difficulty from the patient) will be an aid in determining the nature of the affection.

In many cases a diagnosis can be readily made by the microscopic examination of the pus, which must be taken on a platinum-wire loop from the surface most actively inflamed. To this end a speculum must be passed into the anus or rectum, as the case may be. Pus which has escaped from the anal orifice is liable to be mixed with other forms of cocci; therefore it should never be used. In the early stages of an acute process there will usually be little difficulty in finding specimens of pus in which there are gonococci. In chronic cases of gonorrhœa of the rectum a number of forms of cocci will be found, chiefly, however, staphylococci and streptococci.

Erythema, eczema madidans, intertrigo, and excoriations about the anus may be mistaken by superficial observers for gonorrhœa of the rectum. Hemorrhoids and vegetations about the anus sometimes, as a result of uncleanness, undergo inflammation, which spreads to the contiguous skin and perhaps to the margin of the anal orifice. These cases might be looked upon as instances of rectal gonorrhœa.

**Prognosis.**—Though the course of this affection is often severe and sometimes alarming, its tendency in healthy and cleanly persons is toward recovery. It is stated that in tuberculous individuals local manifestation of their diathesis may occur and a lethal result follow. I have had no experience with such cases.

**Treatment.**—The patient should be confined to the house and placed in a recumbent position. Warm sitz-baths should be taken, and the rectum should be freely injected several times a day with a saturated solution of boracic acid, warm or cold according as it is agreeable to the patient. Enemata, hot or cold, of lead and opium are sometimes very soothing and efficacious. Lead-water and boric acid solution in combination are also of much benefit. It is necessary to free the bowel of feces, and for this purpose castor oil or Epsom salts may be given. In the intervals of defecation suppositories of morphine or opium, sometimes with iodoform, may be used if necessary. When the intensity of the symptoms has passed, slightly stimulating enemata of sulphate of zinc and laudanum may be used. Solutions of bichloride of mercury have not proved of value as injections. Toward the cessation of the suppurating process solutions of nitrate of silver (gr. j-ij-ʒviiij-xvj) may be very useful. To these solutions wine of opium or fluid extract of belladonna may be added.

Gonorrhœa limited to the region of the anal orifice requires constant attention to cleanliness and sitz-baths, and the application (when acute) of lead-and-opium wash, and, later, of bland dusting powders.

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## CHAPTER XIX.

## GONORRHŒA OF THE MOUTH.

OUR knowledge of gonorrhœal infection of the mouth is very incomplete, and further observation and careful clinical and bacteriological studies are necessary before a satisfactory account can be given of it. A study of the cases thus far reported warrants the assumption that there is a specific inflammation of the mouth contracted by beastly and unnatural practices, and perhaps caused by the gonococcus. From the following cases an idea of the clinical history of this affection may be obtained.

One of the earliest cases is reported by Baumés.<sup>1</sup> It was that of a workman in whom the left half of the lower lip was engorged, red, shining, and painful. The surface was covered with whitish granulations, and from it a scanty purulent secretion exuded. This morbid surface looked like the neck of the uterus when the seat of gonorrhœa. The patient stated that this inflammation came on six or eight days after he had kissed the vulva of a woman who he afterward learned was suffering from gonorrhœa. The affection was very rebellious to soothing treatment.

Hölder<sup>2</sup> states that mouth-infection may occur from direct contact with the infected male genital organ. He relates the case of Petrasie, which was that of a young man who had this form of unnatural coitus with a man suffering from urethral gonorrhœa. The day after he had pain in the lips and gums. On the fourth day the mucous membrane of the lips and buccal cavity became intensely red, the gums were spongy and inclined to bleed, with a tendency to recede from the teeth, and the buccal secretion was increased in quantity. Motion of the mouth was painful. Hölder states that the affection begins with a sensation of heat and dryness in the mouth, which at first appears very red. Soon a purulent secretion flows from the swollen and inflamed parts, which may be covered with an aphthous-like exudation. The affection in this case was cured by an alum gargle in eight days.

Cutler<sup>3</sup> also reports a case which is fully as striking as Petrasie's. It was that of a woman who had coitus *ab ore* with a sailor who was found to be suffering from gonorrhœa; the next morning her mouth was raw and sore and the saliva had a horrible taste. On the second day little sores appeared on the lips, and on the third day the gums and tongue became swollen and painful. By the fifth day the whole buccal cavity was so inflamed that she could not eat, and a whitish fluid, mixed with blood, having an unpleasant odor and taste, was secreted. Examination showed the mucous membrane of the lips and cheeks was

<sup>1</sup> *Précis théorique et pratique sur les Maladies vénériennes*, vol. i., Paris, 1840, pp. 210 et seq.

<sup>2</sup> *Lehrbuch der venerischen Krankheiten*, Stuttgart, 1851, p. 288.

<sup>3</sup> "Gonorrhœal Infection of the Mouth," *New York Medical Journal*, Nov. 10, 1888, p. 521.



thickened, reddened, denuded of epithelium in spots, and covered in areas with a false membrane, which was readily detached, leaving an excoriated surface. The gums were swollen, retracted from the teeth, and bled readily on pressure. The tongue was swollen and very tender, and could only be slightly protruded, and then only with much effort and pain. The surface was red and glazed and covered with small ulcers which secreted a thick yellow pus. The soft palate and pillars of the fauces were much inflamed, but the parts beyond were in a normal condition. The breath was very offensive. There was little salivation.

The mouth-secretion consisted of mucus, pus-cells, and epithelium, and contained a large quantity of bacteria. In the false membrane a micro-organism resembling the gonococcus was seen, but its identity was not fully established. Soothing applications brought about an amelioration of the symptoms.

It is unfortunate that an absolutely satisfactory microscopical examination was not made of the secretions of the man and the woman. Much light can in the future be thrown on such cases by the culture of the micro-organisms of the secretions. Whenever possible confrontations should be obtained.

Dohrn<sup>1</sup> reports a series of cases of very young children, born of mothers infected with gonorrhœa, who presented a peculiar form of purulent stomatitis which he thinks is of gonorrhœal origin. The first case was that of an infant born at term, in whom, when eight days old, the mucous membrane of the alveolar borders, the dorsum of the tongue, and the soft palate became inflamed, eroded, and covered with a grayish coating. The affection ran an acute course and was cured in four weeks. Portions of the false membrane were examined microscopically and cultures were made from it, with the result, it is claimed, of demonstrating the presence of the gonococcus. The infant also suffered from gonorrhœal ophthalmia.

Dohrn, in association with Rossinsky, observed four similar cases, all of them in the offspring of women suffering from gonorrhœa. Dohrn thinks that the mucous membrane of the mouth of infants is particularly susceptible to infection by the gonococcus. This particular subject also needs further and extended study, aided by careful microscopical examinations and culture-experiments.

Ménard<sup>2</sup> claims that an ulcero-membranous stomatitis may occur in patients profoundly infected with gonorrhœa. In support of this assertion he published the histories of four cases. In the first case there appeared at the tenth week of gonorrhœa, in a man forty-five years old, first a generalized erythema, then orchitis, and finally ulcero-membranous stomatitis. The second case was that of a young medical student who had gonorrhœa which was complicated with monoarticular hydrarthrosis, and later by ulcero-membranous stomatitis, with swelling of the parotid gland of one side and painful enlargement of the submaxillary and cervical glands. The third case was that of a man thirty-five years old, who, while suffering from old gonorrhœa, had orchitis and ulcero-

<sup>1</sup> *Médecine médicale*, July 15, 1891, p. 352.

<sup>2</sup> "De la Stomatite ulcéro-membraneuse chez les Blennorrhagiques," *Annales de Derm. et Syphiligraphie*, deuxième série, vol. x., 1889, pp. 679 et seq.

membranous stomatitis, limited to the region of the left lower molar tooth. In the fourth case (that of a soldier twenty-six years old with severe gonorrhœa) rheumatism, orchitis, and a typhoid condition of short duration were observed, and were followed by ulcero-membranous stomatitis.

This author claims this mouth-lesion as a direct result of gonorrhœal infection, and that it is not a simple coincidence. He thinks it due to blood-infection by the gonococcus. More light is required on this subject, of which I have no personal knowledge.

In this connection it is well to record some cases in which it is claimed that gonorrhœa was contracted by men from the mouths of women. These cases, however, lack many essential points and do not warrant dogmatic conclusions.

Horand<sup>1</sup> reports the case of a medical student who had natural coitus with his mistress thirteen days prior to July 10th. On that day he had coitus (which was of short duration) with a woman by the mouth. The next day he felt heat in the urethra and saw in the meatus a drop of white fluid. On the third day the discharge was abundant and purulent, and there was pain on urination. At this time gonococci were found in the discharge, and in one pus-cell there were seventy of these organisms. By the use of injections the discharge disappeared in fifteen days, and the man had natural coitus and also by the mouth with his mistress, without any bad results to either. The woman from whom this infection was thought to be derived was found healthy as to her genitals and mouth. Horand thinks that infection occurred from the presence in her mouth of gonorrhœal discharge left there from a previous suction. The weak point in this case lies in the fact that it was so promptly and thoroughly cured in fifteen days. As the search for the gonococcus was made as long ago as 1884, when the knowledge of it was not complete and its differentiation from other urethral microbes was not known, the suspicion is warranted that the infection originated in some micro-organism less virulent than the gonococcus.

Delefosse<sup>2</sup> reports the following case: A man, thirty-nine years old, having had three attacks of gonorrhœa, but having had no urethral discharge for seven years, submitted to prolonged suction of the penis by a woman. Five days later prodromal symptoms showed themselves, which were followed by a typical severe attack of gonorrhœa. No examination of the woman was made nor was the secretion examined by means of the microscope.

<sup>1</sup> "Blennorrhagie contractée dans un rapport *ab ore*," *Lyon Méd.*, vol. 1., 1885, pp. 279 et seq.

<sup>2</sup> "Sur un Cas de Blennorrhagie après Succion de la Verge sans Coit," *Journal des Malad. cutan. et syphil.*, vol. 1., 1889 and 1890, pp. 305 et seq.

## CHAPTER XX.

CONGESTION OF THE PROSTATE, ACUTE PROSTATITIS,  
AND PROSTATORRHŒA.

THE most common form of inflammation of the prostate in the course of gonorrhœa is congestion of more or less severity. This condition occurs with, and is dependent upon, acute posterior urethritis. In the latter condition the submucous connective tissue is the seat of an acute phlegmasia, and as a result the substance of the prostate becomes hyperæmic. With this further extension of the gonorrhœal process the patient has still other symptoms, besides those of posterior urethritis. He complains of a sensation of dull weight and pressure in the perineum deep in the pelvis, and an uneasy sense of fulness in the rectum or anus. In severe cases rectal tenesmus may add to the patient's discomfort. The vesical tenesmus may be increased, and often in defecation the patient experiences severe pain in the prostate when the fecal mass passes under it. When there is much swelling the stools are small and ribbon-shaped. Rectal examination reveals a swollen organ, broader than normal from side to side, and bulging considerably into the rectum. The finger-tip reveals the fact that the part is hot and decidedly painful, and on its withdrawal vesical and rectal tenesmus frequently ensues. In many cases pollutions are a distressing symptom.

In the great majority of cases this congestion is temporary. It may last a few days or two or three weeks; usually, however, resolution takes place in about ten days. With the decline of the posterior urethritis the swelling and tenderness usually subside. In some cases the involution of this congested condition of the process occurs suddenly and unexpectedly a few days after its onset.

A congestion of the prostate may be due to violence from sounds, catheters, lithotripsy instruments, to the irritation of a stone in the bladder and of a fragment of stone, or of small stones impacted in its mucous membrane, and to stricture. It is not very probable, as claimed by some, that injections used by patients in the anterior urethra cause congestion of the prostate.

In chronic posterior urethritis ephemeral congestion of the prostate may be caused by sexual and alcoholic excesses, by masturbation, and by violent exercise, particularly in horseback riding and bicycling.

Examination of the urine gives the same results as are seen in acute posterior urethritis.

In quite rare cases rectal examination shows that certain parts of the prostate are more swollen and harder than the rest. In this condition it may be that certain groups of follicles are the seats of greater oedematous hyperplasia than the balance of the tissue.

In some cases of congestion of the prostate the patient experiences difficulty in urination, and complains of a sensation as if his urethra was too small to allow the stream to pass through it even with great straining. It will be seen, under these circumstances, that the stream is small and



weak, even hesitating and intermittent. In some cases, such is the swollen condition of the organ and of its urethral mucous lining that the patient cannot void his urine, and has to be relieved by the introduction of the catheter. In bad cases there may be vesical and rectal tenesmus superadded, and in some there is spasm of the compressor urethræ muscle. Under these circumstances the patient often fails to thoroughly empty his bladder, and then the residual urine accumulates and causes continuous vesical tenesmus. The bowels are frequently constipated, and when the vesical tenesmus comes on the patient makes painful and often vain efforts to free them.

Congestion of the prostate usually ends in resolution, but it may go on to abscess-formation.

Parenchymatous inflammation of the prostate may develop from the milder or congestive form. In this phlegmasia there is usually suppuration in some part of the organ—hence the name “abscess of the prostate”—which may be a tolerably mild affection, and even a severe and a fatal one.

The formation of pus in the prostate is usually attended by quite well-marked symptoms, such as chills, fever, general depression, a sensation of throbbing in that body, and a feeling as if there was a lump in the rectum. There may also be pain along the urethra in the perineum, rectum, and lumbar region. The further symptoms are painful micturition and defecation. In some cases the urethral canal is entirely occluded by the swelling, and the patient is unable to pass any of his urine. He of necessity lies on his back and flexes his thighs, thereby avoiding all pressure on the perineum.

Abscess of the prostate always begins in one or more follicles, which become acutely inflamed. From this focus the morbid process increases and forms abscesses of various sizes. As a rule, the lateral lobes are more frequently the seat of abscess than the third portion. There may be one or two abscesses, and in exceptional cases there may be as many as from six to twenty. In this event as many different follicles have become the seat of abscess as there are abscesses, which are usually of the size of a pea and even smaller. When the abscess is limited to one lobe and points toward the urethral canal, it may partly or wholly block it up. The introduction of a catheter then to relieve retention will be accomplished with more or less difficulty, and its point will deviate in the opposite direction from the lobe involved. Rectal examination will reveal general enlargement of the organ, and it may happen that the surgeon will be able to ascertain that the process is unilateral.

The size of these abscesses varies considerably. They may contain a teaspoonful, an ounce, and even as much as eight ounces, of pus. The contents of these abscesses may be pure pus free from odor, or it may be sero-sanguinolent; it may be mixed with the débris of the gland or it may be of a very unhealthy character and very fetid.

Abscesses superficially seated in the prostate and pointing toward the urethra cannot, as a rule, be clearly defined by rectal examination, but their presence may be detected by the passage of a catheter of medium stiffness. When the abscess is deeply seated in the prostate, it can generally be well made out by the finger in the rectum.

Abscess of the prostate may also form in an insidious manner, without provoking any general or local symptoms pointing to its existence. I

have seen two instances following gonorrhœa, in which, after apparent cure, the patients on passing water were surprised at the escape of nearly an ounce of pus. In these cases rectal examination showed enlargement of the organ with moderate tenderness. Perfect healing took place. Pitman<sup>1</sup> reports a case in which prostatitis followed gonorrhœa and terminated fatally, with an entire absence of systemic symptoms or of local distress. At the autopsy an extensive abscess, unsuspected during life, was found between the bladder and the rectum.

As a rule, however, when the abscess is fully formed, the constitutional symptoms are much more pronounced than at first. The rigors are more severe and are attended with flashes of heat; there are great thirst, restlessness, and jactitation, very high fever, and sometimes delirium. The pain becomes more violent and the throbbing more distressing, and the sensation of fulness and weight at the neck of the bladder and in the rectum and anus causes agony. These symptoms, together with the frequent scalding urination, made drop by drop or in a thin, feeble stream, stamp abscess of the prostate as one of the most acutely painful and distressing maladies known to man.

With the bursting of the abscess, naturally or by operation, everything is changed. The patient is immediately relieved of his suffering, he can urinate freely, and his febrile symptoms soon disappear. If the inflamed tissues contract and efface the abscess-cavity, as they commonly do, all is well and the patient is spared further trouble.

Unfortunately, however, prostatic abscesses may open into the bladder, the rectum, the vesico-rectal space, the perineum, and the peritoneal cavity. In this connection the statistics collected by Ségond<sup>2</sup> are very interesting. In 102 cases he found the abscesses burst and burrowed as follows: Into the urethra, 64 times; into the rectum, 43; into the perineum, 15; into the ischio-rectal fossa, 8; into the inguinal region, 3; through the obturator foramen, 2; through the umbilicus, 1; through the sciatic notch, 1; at the edge of the false ribs, 1; into the abdominal cavity, 1; and into the cavity of Retzius, 1.

It will be seen that in rather more than one-half of the cases the abscess burst into the urethra, and it is safe to say that at least in a large majority the patients experienced no ulterior trouble.

When the abscess is developed in the posterior portion of the gland the tendency is for it to burst into the rectum, which is a serious condition. It then leaves a fistulous tract which is very difficult to heal, and which allows the escape of urine into the rectum. The pus, however, may burrow downward and point as a red indurated area in the perineum anterior to the anal orifice. It may also pass through the ischio-rectal fossa and appear in the perineum. It may extend toward the scrotum and sheath of the penis, and may pass down to the thigh or upward to the region of the false ribs.

The other modes of burrowing are quite rare, but each of them presents its individual indications for surgical relief.

In the course of these aberrant burrowings many complications may occur, and there is always danger of pyæmia.

<sup>1</sup> *Lancet*, Am. ed., Jan., 1861, p. 69.

<sup>2</sup> "Des Abscès chauds de la Prostate et du Phlegmon periprostatique," *Thèse de Paris*, 1880.

The bursting of the abscess into the peritoneum always causes great pelvic pain and very severe, even alarming, constitutional symptoms. Death usually ensues in a day or two.

In the progress of the burrowing process the patient may experience more or less pain in the parts, which become red, swollen, and hard.

Congestion and abscess of the prostate are generally found in young men from twenty-five to thirty years of age.

Abscess of the prostate is not of frequent occurrence. Ballou<sup>1</sup> observed 3 cases of it in 1000 cases of all varieties of gonorrhœa. Even this is a large percentage, according to the statistics of my clinic and of my hospital services.

**Prognosis.**—Abscess of the prostate is almost always a painful affection, and sometimes a dangerous and even deadly one. In quite rare cases the abscess when not recognized and untreated causes pyæmia and death. The rectal fistulæ are very hard to cure, and they cause much discomfort and suffering to the patient, who becomes an object of aversion to those who come in contact with him.

When the patient is young, otherwise healthy, and of firm fibre and of good habits, his chances of recovery, even when afflicted with bad fistulæ, are usually good. In elderly and sickly individuals the prognosis is usually grave.

### Prostatorrhœa.

As a result of chronic posterior urethritis, of stricture of the urethra, and in subjects who, as a consequence of confirmed masturbation and of venereal excesses, have produced a hyperæmic condition of the posterior urethra, we sometimes see a chronic mucoid discharge to which the term "prostatorrhœa" is applied. This condition, which is also called by some authors "chronic prostatitis," is not a common one, and is mostly seen in young and middle-aged subjects. It may be an affection of little gravity, and then, again, it may be attended with very serious symptoms and associated with a severe form of neurasthenia. In anæmic and neurotic subjects it is often a most distressing disorder. It is also observed in men with markedly strong sexual propensities who commit great excesses, and also in those who suffer from unsatisfied sexual desire. This affection may be permanent and it may be intermittent in character. Then, again, when it persists in a chronic form it may (generally owing to excesses) undergo exacerbations of a very high degree.

The most constant **symptom** is the escape from the meatus of a clear mucous fluid or of a mucus mixed with pus and perhaps a little blood. This mucous fluid may be scant in quantity, only a few drops appearing at the meatus in a day. It may also be more copious, and keep the end of the penis in a moist condition continuously, and in very pronounced cases the escape is so excessive that patients complain of a constant and annoying "dripping," which may wet and stain a large part of their shirt-flap or of the handkerchief which they instinctively make use of under these circumstances. The escape of this discharge in large quantities occurs frequently during the act of defecation, particularly when the fecal bolus is hard and firm. In some cases the escape of the mucus

<sup>1</sup> *New York Med. Journ.*, July 25, 1891, p. 99.



causes a peculiar tickling feeling in the prostate and urethra, while in others it produces pleasurable voluptuous and lascivious sensations. Some patients claim that they can feel the escape of the fluid from the prostate into the urethra. In rather rare cases the escape of mucus, particularly after defecation, is attended with a sickening sensation of great faintness, which may last for several minutes. Many of these cases have been treated for spermatorrhœa.

Riders of some forms of bicycles notice that a clear viscid secretion escapes from the meatus, particularly after long and rough riding. Seeing that in these cases there are no symptoms which point to prostatic or vesical disturbance, it seems probable that the fluid comes from hyperæmic mucous follicles and Cowper's glands.

Although we have no pathological knowledge on the subject, it seems fair to assume that in prostatorrhœa there is such an atonic condition of the compressor urethræ muscle that it cannot prevent the escape of the fluid into the anterior urethra. The next most constant symptom is increased frequency in urination, which may be very excessive or only about twice as often as the normal desire. There may be decided uneasiness at the end of the act, and there may be a slight pain or decided scalding sensation which passes from the prostate to the end of the penis. In many cases the stream is small and weak—a condition which seems to point to an atonic state of the detrusors. A sense of dulness and weight is often felt in the prostate and in the rectum, and pain and uneasy sensations are experienced in the perineum, thighs, and lumbo-sacral regions.

Some patients suffer from chronic prostatorrhœa without becoming much disturbed in mind by it. But there are others to whom this affection is little less than a calamity. They become exceedingly nervous about their trouble, even to the extent of melancholy. They lose flesh, strength, and appetite; they become irritable and incapable of mental and physical exertion. In fact, in some cases the whole morale of the man seems lost.

Besides these cases, in which the trouble is of long duration, we sometimes see patients—particularly continent young men—who are constantly seeing and caressing their sweethearts prior to marriage, and men who fruitlessly try and hope day by day to have connection with a certain woman, who have an acute attack of prostatorrhœa, even with quite pronounced mental and physical disturbance. Intercourse and sexual hygiene, with tonics and fresh air, usually bring around these suffering swains.

In many cases of prostatorrhœa there is more or less disturbance in the sexual function. In some subjects it is morbidly exaggerated; in others there is much desire, much erethism, many erections, but very little is accomplished, owing to precipitate ejaculations. In still other subjects there is little if any desire, even as a result of much excitement, and the penis and scrotum seem cold and lethargic.

In subjects of prostatorrhœa every new gonorrhœa shows a tendency to run back to the posterior urethra and there pursue a severe course. As a result of the hyperæmia the whole organ may become, as time goes on, much hypertrophied.

Rectal examination of cases of prostatorrhœa, which should be made from time to time, reveals an enlarged organ, usually jutting more or less

backward on the gut, and being decidedly broader than normal. Sometimes it feels soft, and again it may seem decidedly indurated. There is commonly more or less tenderness, even severe pain, on pressure by the finger-tips. Urethral examination, even with a small and not stiff instrument, often causes a great outcry from pain when the tip passes through the prostatic urethra.

In the study of cases of prostatorrhœa the surgeon must bear in mind that during intense sexual excitement, with partial or complete erection, without ejaculation and satisfaction, a viscid, glycerin-like looking fluid very commonly escapes from the meatus in considerable quantity. This is not a pathological secretion at all, but is the product of Cowper's glands and of the urethral follicles, which have become suddenly the seat of hyperæmia. The prostate is not in any way concerned in its development. This symptom has often been considered by patients and physicians as due to spermatorrhœa. This secretion is called *urethrorrhœa ex libidine*, and has its congener in the flow of saliva produced by the sight or odor of a tempting meal.

The character of the secretion varies in different cases and in different stages of the affection. If the case is one of simple uncomplicated prostatorrhœa and seen early, we sometimes find under the microscope amyloid bodies in concentric strata, cylindrical epithelial cells in double stratiform disposition, with their prolongations running into a cluster of small round-cells (Fürbringer), and small, fairly refractive granules of half the size of red corpuscles. According to Fürbringer,<sup>1</sup> the addition of a drop of a 1 per cent. solution of acid phosphate of ammonia to a drop of the prostatic secretion placed on the glass slide will, after a couple of hours' contact, reveal the presence of what are called "spermatic crystals," and also Boettscher's crystals, the basis of which exists only in the prostatic secretion. In the majority of cases, however, there has been, either as a result of gonorrhœa or of instrumental interference, infection of the posterior urethra, and a purulent secretion is produced. Under the microscope the appearances of this secretion are similar to those of posterior urethritis. (See page 75.)

When the prostatic secretion is viscid and small in quantity, the urine in the first glass will be cloudy, and the second perhaps quite clear. In some cases, however, it will be observed that, while the first urine is cloudy and the second specimen clear, the third will be more or less faintly cloudy and may appear milky, and the specimen will give forth the odor of semen. In this event it is very probable that the final contraction of this prostate squeezed its follicles quite forcibly, and thus expelled some of their secretion. Examination of this rather exceptional third specimen will sometimes reveal the appearances just described of amyloid bodies, cylinder epithelium, etc.

The condition of the prostate and of its secretion may be quite clearly made out by the procedure advocated by Von Sehlen.<sup>2</sup> The patient urinates into two small glasses, thus leaving some urine in the bladder. He then leans forward, placing the trunk at right angles with his legs (Von Sehlen prefers the genu-pectoral position), and the surgeon with his

<sup>1</sup> *Op. cit.*

<sup>2</sup> "Zur Diagnostik und Therapie der Prostatitis chronica," *Intern. Centralbl. der Harn- und Sexual-organe*, vol. iv., 1893, pp. 310 et seq.

finger in the rectum kneads or massages the prostate. This operation causes the escape of prostatic fluid (if there is any) into the urethra. The patient then passes the remainder of the urine, which carries all this pressed-out secretion into the third glass. After settling the various specimens of urine may be examined, and their contents studied in connection with the clinical symptoms.

**Treatment.**—When, during gonorrhœa, symptoms of congestion of the prostate are observed, the patient should at once be put to bed and treated on antiphlogistic principles. The bowels should be kept free and the diet should be of gruel or bread and milk. In the case of strong individuals six or more leeches may be applied just in front of the anus, and the patient then put in a hot sitz-bath. No general rule can be laid down as to the use of heat or cold. In some cases heat gives marked relief, and in others cold acts equally as beneficially. Hot flaxseed poultices or the hot-water bag, with the intervention of some lint well moistened with water, may be applied to the perineum. In these cases very warm enemata act well on the prostate and free the rectum of feces. In case cold is more grateful, an India-rubber bag filled with ice-water or broken ice may be applied to the perineum, on which a folded towel must be placed so that the intensity of the cold may be moderated to suit the patient's feelings. Injections of a few ounces of cold water at intervals into the rectum, the insertion of a small well-rounded piece of ice or irrigation, with the double catheter apparatus recommended by Finger, may be tried. From either heat or cold much relief may be obtained. All urethral injections being suspended, the patient may take the potassa-and-hyoscyamus mixture (see page 131), and drink freely of diluent waters of various kinds, according to the preference of the surgeon. Morphine or opium should be given generously, if necessary, by the mouth or in the form of suppository in order to relieve pain.

In favorable cases, which are most common, resolution occurs within two weeks, and often in a shorter time. When the patient is up and around again he may be much benefited by lavages of a very mild solution of nitrate of silver, gr. j- $\overline{3}$ vij- $\overline{3}$ xij, which should be given every second day, and every day if well borne and beneficial.

If during the course of congestion of the prostate complete retention of urine occurs, it should be carefully drawn off. For this purpose an aseptic silk or lisle-thread catheter (which is both flexible and at the same time firm and very smooth), of a calibre of not more than 12 or 13 French scale, should be introduced into the bladder.

The treatment of abscess of the prostate should be based on general surgical principles, together with the observance of strict antisepsis. The first essential is to determine, if possible, in which direction the abscess points. If the inflammatory swelling pushes into the urethra, the surgeon will very often have timely warning by reason of the difficulty, and even impossibility, of urination which the patient experiences. In such cases the catheter must of necessity be used, and, fortunately, it very often causes the abscess to open and discharge. In desperate cases suprapubic cystotomy with direct puncture of the abscess has been recommended, but it is a question in my mind whether a patient so sorely tried as is a man having a severe prostatic phlegmon near the urethra could undergo the manipulation necessary for opening the bladder by this route.



While in general the abscess-cavity in the prostate granulates, contracts, and heals up without leaving a marked if any depression, it is well, if the organ remains swollen, as determined by rectal examination, to throw into the bladder hot boric-acid solutions or hot Thiersch's solution once or twice a day.

When the prostatic abscess points toward the rectum, it is always best to open it by an incision made with a long sharp bistoury directly in the median line, about half an inch in front of the anus. The fore finger of the left hand should be placed in the rectum, while the surgeon makes this incision, which before the withdrawal of the knife should be made sufficiently large for irrigation and ample drainage.

When the abscess is so extensive that it has produced œdematous swelling in the anterior wall of the rectum, it may be punctured and evacuated by the introduction of the long curved trocar. After this operation it is absolutely necessary to prevent the reaccumulation of pus by gentle massage with the finger-tip, and to irrigate the parts once or twice a day with hot boric-acid solution or Thiersch's solution.

The treatment of aberrant forms of prostatic abscess should be based on the anatomical and pathological indications presented by each case. Periprostatic phlegmons should be treated in the same manner as those just considered.

The local treatment of prostatorrhœa is in the main that of chronic posterior urethritis. When the affection is in an acute condition, so frequently seen in exacerbations, hot boric-acid solution may be of decided benefit. It sometimes happens that intravesical injections, even of the blandest nature, by the way of the posterior urethra, give rise to discomfort, in which event they should be stopped, as well as all other operative interference. Later on lavages and instillations may be used with benefit. It is always well to remember that in these cases very strong solutions of any kind do more harm than good. Care also must be taken in the use of sounds, since in these cases over-distention is often productive of much harm and suffering.

In the treatment of anæmic, neurotic, and neurasthenic subjects affected with prostatorrhœa all morbid indications should be sought for and efficiently met. Sexual hygiene is of the very first importance, and the surgeon should thoroughly familiarize himself with all facts relating to it and institute appropriate measures of relief. There is such a disparity of conditions in these cases that further amplification would occupy too much space. For such cases good food, fresh air, relaxation, and all good hygienic surroundings are great aids. Medication, good advice, and encouragement based on common sense will do much for the relief and cure of these chronic and often trying cases.

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## CHAPTER XXI.

## INFLAMMATION OF THE SEMINAL VESICLES.

THIS affection, also called seminal vesiculitis (Dolbeau and Le Dentu), spermato-cystitis (Naumann), and gonocystitis (Gouley), though treated of more or less fully by Lallemand, Civiale, Gosselin, Fournier, Rapin, and others, was very little understood and very frequently unrecognized until within the past few years, and it is mainly through the writings of Mr. Jordan Lloyd<sup>1</sup> that an impetus in its study has been inaugurated. Mr. Lloyd claims that this affection is among the most common of the complications of gonorrhœa, and that its signs and symptoms are misunderstood or misinterpreted and attributed to different organs altogether.

It is well to bear in mind the structure, situation, and relations of the seminal vesicles. (See pages 52 and 53.)

Seminal vesiculitis may be acute or chronic. The acute form has many points of analogy with epididymitis. Both affections are almost always secondary to gonorrhœa occurring in the third or fourth week, or to hyperæmia of the posterior urethra due to masturbation and venereal excesses, or to inflammation of this region resulting from traumatism, catheterization, endoscopy, and strong injections. In both there is inflammation of the mucous membrane and hyperplasia of the connective tissue. In epididymitis the testicle does not swell, and in seminal vesiculitis the prostate is not usually affected. In both cases suppuration, in the sense of abscess-formation, is the exception and resolution the rule.

The **symptoms** of the acute form of seminal vesiculitis are quite similar to those of posterior urethritis and to those given as diagnostic of the several varieties of prostatitis. The patient first experiences pain, either of a dull or throbbing character, or a sensation of weight, which he refers to the deep portion of the pelvis just within the anus or at the neck of the bladder or in the perineum. There is markedly increased frequency in urination, and tenesmus sometimes mild, again quite decided, and in some cases very severe. As the bladder fills the painful symptoms increase in severity, and there may be pain at the end and sometimes at the root of the penis. There may be fever, chills, and malaise. All these symptoms may be present in posterior urethritis, so that the crucial test in diagnosis is palpation of the prostate and seminal vesicles by means of the finger in the rectum. If the case is one of acute posterior urethritis, the prostate will be tender, even painful, on pressure, and perhaps swollen. If seminal vesiculitis is present and explored for early, one or both vesicles will be found to be much enlarged in all directions in the shape of a distended leech, hot, brawny, and exquisitely tender. In a few days the

<sup>1</sup> "On Inflammatory Disease of the Seminal Vesicles," *Brit. Med. Journ.*, vol. i., 1889, pp. 882-884, and on "Spermato-cystitis (Inflammation of the Seminal Vesicles)," *Lancet*, Oct. 31, 1891, pp. 974 et seq. The reader is also referred to an admirable chapter on the seminal vesicles and their pathology by Professor Gouley in his *Diseases of the Urinary Apparatus*, New York, 1892, pp. 263 et seq., and to the essay of Guélliot, *Des Vésicules séminales*, *Anatomie et Pathologie*, Paris, 1883. In this essay will be found a good bibliography of the whole subject up to the time of publication.

swelling may still further increase, and then moderate fluctuation may be felt. In some of these cases the patient presents a pitiable spectacle. He suffers from pain in the perineum, rectum, bladder, and at the top of the sacrum. He has frequent desire to urinate, and the act is attended with much pain, or, again, in some cases, there is very distressing dysuria. Defecation is very painful, and perhaps complicated with rectal tenesmus, and may be attended with vesical spasms; sleep is heavy and unrefreshing, and often during the night painful erections and pollutions, perhaps bloody, may add to the patient's sufferings. The urine may contain pus and epithelial cells, but these tissue-elements may be absent for hours or for days, during which the urine is clear; and in this feature acute seminal vesiculitis differs from acute posterior urethritis, in which the discharge of pus or blood is constantly seen. At the onset, and early in the course, of seminal vesiculitis the gonorrhœal discharge may disappear entirely, and in this it resembles epididymitis. But in a short time the discharge reappears, and it may be more or less bloody. In seminal vesiculitis the blood is mixed with the pus or the latter is streaked with it, whereas in posterior urethritis the blood follows the act of urination, or there may be a worm-like thread of coagulated blood with the first jet of the urine.

The inflammatory stage of seminal vesiculitis usually pursues a course similar to that of epididymitis, and at the end of a week or ten days the symptoms become ameliorated and resolution gradually sets in. In all probability, in many cases the parts sooner or later become normal again. In some cases after resolution of the vesicular inflammation the urethral discharge reappears, while in others the urethra is left in a healthy condition. In this acute stage of inflammation the morbid process resembles that of gonorrhœa in the redness and swelling of the mucous membrane and in the submucous cell-increase. When, however, the phlegmasia becomes intense, a true suppurative process or abscess forms, in which event the local and general symptoms are more pronounced and the sufferings of the patient greater. Rectal exploration then reveals a large boggy, painful swelling at the base of the bladder, beyond and to the outer edge of the prostate. This swelling is very large when both vesicles are involved.

Dr. Gouley's remarks on this subject are very pertinent. He says: "If the swelling is in the form of a single, hard, oblong tumor extending from the base of the prostate upward, backward, and outward, the presumption is that the phlegmasic process has not extended beyond the proper capsule of one vesicle. If, however, there is a diffuse, doughy swelling extending beyond the median line, it is likely that both vesicles are involved, that perforation of their walls has taken place, and that the ambient connective tissue is infiltrated."

While the ejaculatory duct of the seminal vesicle remains patulous the contained pus may escape, or perhaps may be milked, by means of the finger-tip, into the urethra, in which event full resolution without ulterior bad results may occur. If, however, the duct becomes occluded by the swelling of its mucous membrane or by being plugged up by sympexia or masses of mucus dislodged from the diverticula of the vesicle, the abscess may attain a very large size, and the pus may perforate its wall and burst into the ischio-rectal fossa or around the rectum into the bladder, the



rectum, and the peritoneum, sometimes causing death, and generally leading to the formation of fistulous tracts which are very difficult to cure.

Mr. Mitchell Henry<sup>1</sup> reports the case of a sailor who simply complained of pain in the loins and hip, the joint of which was painful on motion. The urine was loaded with pus and blood. Acute peritonitis developed and caused death. At the autopsy an abscess of the left seminal vesicle was found, the pus of which had first burst into the bladder and then into the peritoneum. A similar case was reported to Mr. Henry by Mr. Cock.

Velpeau<sup>2</sup> reported the case of a young man suffering from gonorrhœa who had abscess of the seminal vesicles which perforated the recto-vesical cul-de-sac, causing peritonitis and death. A similar case is reported by Peter,<sup>3</sup> in which peritonitis originated in an abscess of the seminal vesicle.

It is probable that seminal vesiculitis may eventuate in hydrocele of these diverticula. Dr. N. R. Smith<sup>4</sup> reports the case of a man having a pyriform tumor occupying the cavity of the pelvis and extending above the umbilicus. This tumor was situated behind the bladder and in front of the rectum. It was regarded at first as a distended bladder. A catheter being passed, an ounce of perfectly normal urine was obtained. On pushing the catheter upward and forward the tumor glided upward. The finger in the rectum found a normal prostate, and on its left an elastic tumor, pressure on which caused motion of its fluid to be appreciable on the abdomen. Ten pints of a brown serous fluid were drawn. The cyst disappeared after two tapplings. Dr. Ralph<sup>5</sup> describes a similar case in which this condition was verified at the autopsy.

Mr. Lloyd states that the abscess never ruptures into both bladder and rectum. In any of these very painful events examination of the parts is necessary, and from it the line of operative procedure will be arrived at. The intimate relations of the vas deferens, the ejaculatory duct, and the seminal vesicles are such that the last structures and the testicles may be involved at the same time. It is probable that in many cases seminal vesiculitis and epididymitis coexist, but that the violence of the symptoms of the testicular trouble masks that of the vesicular affection. It is also very probable that the intrapelvic pain which so frequently accompanies acute epididymitis, and which we have been taught is due to a complicating phlegmasia of the pelvic part of the vas deferens, is sometimes really symptomatic of involvement of the seminal vesicle. There is a field for observation in this direction, and much may be learned from digital exploration of the rectum in cases of acute testicular inflammation. The statement of Mr. Lloyd that this affection is a common accompaniment of gonorrhœal epididymitis needs confirmation.

It can be readily understood, after a consideration of the foregoing facts, why acute seminal vesiculitis has often been wrongly diagnosticated as posterior urethritis, as acute prostatitis, and by many, under the influence of old ideas, as inflammation of the vesical neck and floor of the bladder.

### Chronic Seminal Vesiculitis.

This form of seminal vesiculitis may result from the non-occurrence

<sup>1</sup> *Med.-Chir. Transactions*, vol. xxiii. p. 307.

<sup>2</sup> *Med.-Chir. Rev.*, 1857, vol. i. p. 270.

<sup>3</sup> *L'Union médicale*, 1836, x. p. 562.

<sup>4</sup> *Lancet*, vol. ii., 1872, p. 559.

<sup>5</sup> *Ibid.*, vol. ii., 1876, p. 782.

of resolution in the acute affection, and in this event the clinical history is tolerably clear and striking. But in the majority of cases of chronic seminal vesiculitis it begins as a low-grade inflammatory process in persons, particularly of neurotic or neurasthenic types, who may suffer from chronic subacute posterior urethritis or chronic prostatitis, and in confirmed masturbators and in those given to excessive venery and alcoholics. The difficulty in the study of the chronic form of seminal vesiculitis is that in many cases the symptoms are so few and so vague, and point so indefinitely, if at all, to trouble in these vesicles, that oftentimes their origin is not suspected by the physician. Then, again, cases are seen in which the symptoms are very clearly and strongly marked, yet they may be with seemingly good reason attributed to trouble in the posterior urethra and in the prostate.

Cases of seminal vesiculitis which follow quite directly a recent or more or less remote attack of gonorrhœa very often present such a group of symptoms that the surgeon is led to suspect their origin in inflammation of the seminal vesicles, particularly if no trouble is found in the posterior urethra. Such patients state that since an attack of gonorrhœa or a relapse they have not felt well as regards their sexual organs. Some complain that they are sexually weak, that they have little desire, or that they have premature and perhaps painful ejaculations, which in some cases are mixed with blood. Others, again, are subject to a constant slight or profuse discharge which is of a mucous or muco-purulent character. Again, this form of discharge may be intermittent. There may be, however, a decided chronic seminal vesiculitis without any discharge which is perceptible. Not infrequently patients having a history of one or more attacks of gonorrhœa state that they suffer with a mild or moderately severe, even burning, pain or itching, or a sense of weight in the course of the urethra, in the perineum, bladder, anus, and rectum. In addition to this they often give a history of sexual erethism with or without gratification in coitus, and sometimes of increased desire, while little relief, and even aggravation of symptoms, may follow the sexual act.

Gouley lays stress on the occurrence of painful spasmodic contracture of the anal sphincter both in acute and chronic seminal vesiculitis. He very rightly calls attention to spermatic colic due in all probability to the lodgement of sympexia, retained semen, and mucous masses or plugs in the duct of the vesicle.

In the cases of pronounced masturbators, in those given to excessive sexual indulgence, particularly with the addition of alcoholic excesses, chronic seminal vesiculitis may sometimes be found. These cases are often those of anæmic, neurotic, and neurasthenic subjects who respond very indifferently to treatment. Such patients may complain of some pain or disturbance in the urethra, bladder, anus, or rectum, and they may present a discharge; then, again, all these symptoms may be wanting. Most of them, however, give a history of a disturbance in the sexual function similar to those just detailed. These disturbances are mainly of two forms: first, those of lowered power, and, second, those of erethism of the sexual organs. In the first order of cases we find absence or incompleteness of erections, pollutions from slight causes, without enlargement of the penis. In these cases there is often a haunting desire for erection, with no response. Very often these patients suffer from a con-

stant dribbling of a dirty gray or brownish mucus, which may during the day be so copious as to saturate one or two pocket handkerchiefs. Then, again, some of these patients have no such discharge, but an emission of a thin, gray, watery, and sometimes brownish and even curdy fluid occurs daily or more frequently. Such is the erotic condition of these patients that the sight of a pretty woman, of her breast or her ankle, throws them into a high state of nervousness and sexual erethism. I have known several instances in which one woman only exerted this morbid influence upon the man. Accidental slight contact, the glance of the eye, the sound of the voice, and the grasp of the hand served to so excite and exalt them sexually that an orgasm, with or without partial erection, would result.

These cases run a somewhat peculiar course. In some the symptoms and conditions continue in a more or less subdued manner, and, though they disturb the patients considerably, the latter arrive at a state of mind by which they bear their troubles more or less philosophically. In this class of cases the affection runs on from year to year in a monotonous way. Such patients are neither healthy nor very sick. But cases are sometimes seen in which the chronic, uneventful course of the affection is varied by the development of more or less severe exacerbations. In this event the health becomes deteriorated, the patients lose their appetite and weight, and present the appearance of very weak and sick men. Concomitantly with this condition the nervous system becomes much disturbed and the patients present the symptoms of neurasthenia. A nervous apprehension and anxiety are very frequent concomitants. Such an exacerbation may last one month or many months, and may lead to permanent invalidism.

In old men suffering from hypertrophy of the prostate a low grade of seminal vesiculitis is a not uncommon concomitant. In many of these cases the vesicular complication passes unnoticed, for the reason that it may give rise to no symptoms at all, or, if present, they are not pronounced in character. Then, again, they may be masked by the disturbances produced by the prostatic affection.

Tuberculosis of the seminal vesicles will only be touched upon lightly here. The onset of the affection is attended with moderate and not well-defined symptoms, which are frequently referred to the posterior urethra and the prostate. When the affection begins, as it rarely does, primarily in the vesicles, the symptoms may be for some time so mild and vague that they are not understood. Beginning in the prostate, as so commonly occurs, tuberculosis either goes backward to the vesicles or downward to the testicles. With the involvement of the posterior urethra the symptoms are increased frequency of micturition, pain with the act, occasional hemorrhages, and a purulent discharge. With the extension backward to the seminal vesicles these symptoms become more pronounced. The rectal touch then shows that the prostate is swollen and hard, with well-defined borders and an irregular nodulated surface, on which there may be spots which feel soft. At the distal end of the prostate the seminal vesicles also are swollen. In the early stages of the process that portion only which merges into the prostate is thickened, hard, and perhaps nodular. With the further extension of the disease the whole organ becomes enlarged, hard, uneven, and nodulated. This period of density



and nodulation of the vesicles may be only transitory, and there is left a voluminous, smooth, and perhaps doughy tumor. Richet compares the sensation conveyed to the finger-tip to that of sebaceous cysts or to a pocket injected with tallow. This sensation is due to the softening of tuberculous matter. Guélliot emphasizes the point that induration and nodulation are not, as we have been taught, absolutely constant in tuberculosis of the seminal vesicles. Out of fifty cases examined by him, he only observed these signs eight times.

In addition to the symptoms already given of tuberculosis of the seminal vesicles (and it must be remembered that this affection is generally a concomitant of a similar process in the prostate), there is much sexual erethism. In some cases the genital excitation amounts even to torment. Erections are strong and constant, desire for coitus is continuous and imperative, and pollutions are frequent. This excitation is the outcome of the hyperæmic condition of the infective process. As degenerative changes take place in the tissues the condition changes, the desire slowly abates, and finally the genesic function is wholly lost. This form of genital tuberculosis is usually concomitant with involvement of other vital parts which in the end leads to death. Cases are on record, however, which go to show that tuberculosis of the seminal vesicles may undergo degenerative changes—caseation and absorption, followed by atrophy and fibroid degeneration.

There is an important point in the clinical history of chronic seminal vesiculitis concerning which our knowledge is very limited, and which requires much future study on a scientific basis. This may be formulated in these questions: Is chronic seminal vesiculitis the starting-point of tubercular infection? and about how frequently does this infectious complication occur? It is as reasonable to suppose that a chronically inflamed seminal vesicle may become tuberculous as it is that an epididymis similarly affected may be, and we know that such is sometimes the case. But as regards the seminal vesicles we have little knowledge of a scientific nature.<sup>1</sup>

**Diagnosis.**—The diagnosis of seminal vesiculitis, in whatever form it may exist, is to be arrived at mainly through palpation of the parts by the finger inserted into the rectum. It has already been shown how little light the subjective symptoms throw upon the nature of the trouble. It is not, as a rule, as easy as it is claimed to be by some to make out clearly the outlines and dimensions of the seminal vesicles. In the examination some authors state that the patient should bend the body forward as far as he can, his feet being about a foot apart. It is always well that the bladder should be full, for in that condition the vesicles are more readily

<sup>1</sup> In an interesting essay Dr. E. Fuller ("Persistent Urethral Discharges dependent on Subacute or Chronic Seminal Vesiculitis," *Journal Cutaneous and Genito-urinary Diseases*, June and July, 1894) reports 22 cases of chronic seminal vesiculitis, in 7 of which he thinks that there was tubercular involvement. This subject is so important that we must insist on strong proof before accepting statements regarding it. There is no absolutely clear history in Dr. Fuller's cases of a coexistent tubercular affection elsewhere in any of his patients, except in three cases, and in them it is vague, and the diagnosis is mainly based on the patient's poor condition, the failure of stripping of the vesicles to cure the trouble, and the improvement under good hygiene and nutritive treatment. On so important and yet so obscure a subject we should be slow to make dogmatic statements regarding tubercular complication, knowing, as we do, that seminal vesiculitis is not infrequently a concomitant of a state of ill-health which may even be alarming.

detected. Then the finger (which should be a long one) is introduced into the rectum, and then, having defined the outline of the prostate, the vesicles are sought for above and to the outside of this body.

This examination can also be made with the patient on his back in the lithotomy position, in which event the bladder, being full, tends to sag down in the pelvis. It is easy to conceive that in some patients in the bending-forward-and-standing position the bladder may tilt forward toward the abdominal wall, and then the vesicles will be more inaccessible.

At the prostate the two vesicles approach to within a finger's breadth of one another, and on the inner side of each is the vas deferens, which at this part frequently becomes much ampullated. I myself think that very often this ampullation of the vas deferens, which may be increased in size by the gonorrhœal or chronic hyperæmic process, is mistaken for enlargement of the seminal vesicles. It certainly is next to impossible to say from rectal examination in life that the vas deferens is not swollen and the vesicle is. These parts are in such intimate juxtaposition that it is nearly impossible to distinguish between the two. It is important, also, to have a good knowledge of the structure and physical characters of the vesicles in their normal state. To this end study on healthy men is necessary. The seminal vesicles in health have a firm, somewhat resistant structure, which, while not presenting a brawny feel to the touch, gives the sensation of having tolerably thick walls. Therefore the surgeon must not enter upon the examination with the idea that he is to feel two oblong, rather soft, and readily-compressible little bladders.

If diseased, the seminal vesicles will, in the acute stage, feel much swollen in all directions, tender, perhaps hot, and may present a doughy sensation, like that of the over-filled leech. In the stage of abscess the swelling will be great, the pain intense, and the symptoms severe and pointing to intrapelvic trouble.

In the chronic forms a large flabby tumor may be felt. If both vesicles are involved, the base of the bladder beyond the prostate is the seat of the tumor, which is usually of goodly size, often very large. Abdominal pressure, exerted deep down and toward the pelvis, may often afford much aid in these examinations. Some authors lay stress upon the presence of a sound in the bladder, pushing it base downward toward the rectum, as being of great help to the finger in the rectum. Perhaps in some cases this procedure may be admissible or practicable, but it should never be resorted to without due thought concerning the nature of the case and the state of the deep urethra and prostate. In all acute cases the introduction of the sound as an accessory aid to diagnosis is strictly interdicted. In chronic cases the surgeon must always remember that the posterior urethra may be the seat of a low grade of inflammation, and that the prostate may also be at least hyperæmic. This same caution applies very strongly to the cases of old men who are suffering from enlargement of the prostate and also from a chronic inflammatory condition of the seminal vesicles—a complication which is sometimes met with.

Examination and manipulation of the seminal vesicles by means of the finger-tip cause a flow of pus, with perhaps blood, into the urethra when the inflammation is recent and active. In the subacute cases the discharge is muco-purulent and mucoid, containing masses of inspissated semen,

masses of mucus, sympexia, and sometimes very minute calcareous concretions.

**Pathology.**—In the acute gonorrhœal stage it is probable that the lesion of the mucous membrane is similar to that of gonorrhœa of the urethra. This is a field worthy of careful study. As yet the observations have been macroscopical rather than microscopical. In the main, the morbid process consists of swelling of the mucous membrane and small-cell thickening in the submucous connective tissue. The vesicles then may be much dilated, or, again, they may, by contraction of the newly-formed tissue, become much shrivelled. Within the vesicles a brownish mucus, muco-pus, spermatozoa alive or dead, sympexia, and calcareous concretions may be found. Gouley states that of sixty dissections of the seminal vesicles made in cases of prostatic enlargement, in three-fourths of them the vesicles were shrivelled and hard.

Cancer of the seminal vesicles is very rare, and usually secondary to involvement of the prostate, testicles, bladder, and, very rarely indeed, of the rectum. Guélliot could only report one case in which it was probable that the malignant process began primarily in the vesicles. Out of 13 cases of secondary cancer of these structures, he found it consecutive to cancer of the testicles in 1 case, to cancer of the rectum in 1 case, to cancer of the bladder in 3 cases, and to cancer of the prostate in 8 cases. Gouley alludes to one case, but gives no particulars. Zahn, according to Kocher,<sup>1</sup> has reported a case which he believes to have been one of primary sarcoma of one seminal vesicle. The patient was seventy-six years old, and his urine was passed by drops. At the autopsy infiltrations of sarcoma, which were regarded as secondary, were found in the heart, mesentery, and small intestine. The prostate was healthy, but both seminal vesicles were enlarged and infiltrated with round and spindle-shaped sarcoma-cells.

**Prognosis.**—In the acute form of this trouble resolution usually takes place. In the chronic forms amelioration and cure may be obtained. In some cases, however, the morbid process goes on to the formation of large tumors which require operative measures. Tubercular infiltration of the seminal vesicles may perhaps undergo resolution or lead to cicatrization or caseation, but in most cases it is continuous with or concomitant to a similar affection of other organs, and in the end death results. In malignant new-growths a lethal outcome is inevitable.

**Treatment.**—When recognized in the acute stage, seminal vesiculitis is to be treated on the general principles which govern the management of all phlegmasiæ of the genital and urinary organs. Hughes of Dublin recommends the application of three or four leeches to the anterior wall of the rectum (previously cleansed and disinfected) near the vesicles. This procedure will always be found to be difficult and disagreeable, so that the best plan is to apply a large number of leeches upon the perineum and the margin of the anus. Injections of cold water may be used, and the rectum may be packed with ice if the procedure is pleasant to the patient. Opium in suppositories, diluents, and saline cathartics may be administered as necessity requires.

Should an abscess form, it may be reached by means of a long incision, as suggested by Mr. Lloyd, in the perineum just anterior (about

<sup>1</sup> *Die Krankheiten der Männlichen Geschlechtsorgane*, Stuttgart, 1887, pp. 638 et seq.



three-quarters of an inch) to the anus, great care being taken that the membranous urethra, the prostate, and the rectum are not cut. In this operation much aid will be given by means of the finger in the rectum. The incision may be made in the median line laterally, or, if both vesicles are the seat of acute suppuration, it may be crescentic. Then the dissection between the base of the bladder and the rectum must be cautiously made. The resulting cavity should be treated on general surgical principles. When the abscess is not large, but is well defined, Gouley recommends that the "parts should be brought to view by means of a Sims speculum in the rectum, and a slightly-curved aspirating needle, not less than two millimetres in calibre, should be thrust into the abscess and the cavity quickly emptied, and then well irrigated with a warm sublimate solution (1:5000). A single aspiration may suffice, but in case the cavity refills the aspiration and irrigation should be repeated."

In more acute and extensive abscesses Gouley recommends free incision through the rectal wall, followed by careful antiseptic packing. If these operative procedures through the rectal wall are adopted, it is important to remember that the after-treatment must be conscientiously carried out, bearing in mind the great danger of sepsis and the possibility of the formation of fistulæ.

In the treatment of chronic seminal vesiculitis, in which we may find distended pouchy vesicles, much stress has recently been laid by Dr. E. Fuller<sup>1</sup> upon what he terms stripping or milking the vesicles. This procedure is accomplished by the finger-tip gently but firmly pressing or kneading as much of the organ as is within reach from above downward, so as to express the contents through the ejaculatory duct into the prostatic urethra. Fuller causes the patient to bend his body at right angles to his lower extremities, and in this position he introduces the finger, all the while making counter-pressure on the abdomen, the bladder being, if possible, well filled. Should there be resistance of the perineal muscles, it is recommended that the surgeon should rest his foot on a chair, then, with the knee well braced against the elbow, such firm and continuous pressure may be exerted as will enable the surgeon's finger to reach the vesicle, the resistance of the muscles having been overcome. By this manoeuvre Fuller thinks that he has succeeded in some difficult cases. As has already been said, it is no easy matter in many cases to reach the vesicles and clearly define their size and shape, even when every favoring condition is present. Then, again, at the best, only the lower half of the vesicle is really accessible to the stripping process. Further than this, it must be very clearly remembered, as has already been pointed out, that the seminal vesicles are made up of blind-ended tubes or diverticula, and that they have not the structure and arrangement of racemose glands, firm pressure on which will cause the contents to exude into the excretory duct. An inspection of Fig. 30 will clearly show that it is a physical impossibility to cause the contents of the third tube—or, as we call it, the handle of the jack-knife—to exude into the urethra, for the reason that it is a blind sac or pouch, its non-patulous part ending downward near the prostate. This portion of the vesicle is fully as large as the other two-thirds are, and the contents of this large part cannot in any way be extruded into the urethra. For anatomical reasons it will be

<sup>1</sup> "Seminal Vesiculitis," *Journ. Cut. and Gen.-urin. Diseases*, Sept., 1893.

clearly seen that the utmost that can be accomplished in stripping or milking a vesicle is to act upon about one-quarter of its whole structure. I have no doubt that the ampullation of the vas deferens, which is so common near the prostate, has often been mistaken for enlargement of the seminal vesicles. In theory, stripping the vesicles seems to be a rational treatment, in that it seeks to rid these organs of retained chronic inflammatory matter and to restore the tone in muscular and mucous tissues which have become relaxed and flabby. Undoubtedly, in some cases benefit may result from the proceeding, but as yet the cases in which it has been employed are so small in number and so wanting in conspicuously brilliant and uniform results that it must for the time be considered simply as a therapeutical suggestion, and it is for the future to determine the extent of its worth. Certainly the muscular movements of urination, defecation, and emission must and do produce much effect upon the condition of the seminal vesicles, and in all probability the normal state of these sacculated appendages is largely dependent upon these normal "strippings" and "milkings."

The treatment of the cases of chronic seminal vesiculitis in which there is neurasthenia, debility, and often great mental depression belongs largely to the domain of general medicine. Such cases require good hygiene—if possible an entire change of scene, rest, and pleasant surroundings. Tonics combined with *nux vomica* and *ergot* produce much benefit. Iron, quinine, and *coca* are also indispensable in some cases. The urethra, bladder, prostate, and seminal vesicles should be very carefully examined by instruments and by inspection of the urine. If there is, as so frequently happens, a coexistent posterior urethritis, this should be properly treated. I have seen cases of cure in which the foregoing measures have been carried out. Then, again, only amelioration of the symptoms may be produced. In some cases the health seems to be restored for a short or long period, and then a relapse occurs and the whole treatment has to be repeated.

In the treatment of large hydroceles of the seminal muscles one or moreappings above the pubis may effect a cure. In cases of abscess-formation the cyst, which is usually of large size, must be reached through an abdominal incision, well sterilized, packed with gauze, and allowed to heal from the bottom.

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## CHAPTER XXII.

### EPIDIDYMITIS AND EPIDIDYMO-ORCHITIS (SWELLED TESTICLE).

THE most frequent complication of gonorrhœa is an inflammation of the epididymis which may be sharply limited to that appendage or it may also involve the testicle. The former is called "epididymitis," and the latter "epididymo-orchitis," and both are known under the title "swelled testicle." In some cases of swollen testicle there is a concomitant inflam-

mation of the vas deferens in more or less of its extent, and to this phlegmasia the terms "deferentitis" and "funiculitis" have been applied. This complication is also called, less correctly, "inflammation of the spermatic cord" when that portion near or in immediate continuity with the epididymis is involved. Acute inflammation of the tunica vaginalis, with a greater or less amount of effusion, also occurs in cases of swelled testicle, particularly when the morbid process is centred in the epididymis.

In former years swelling of the testicle in the course of acute and chronic gonorrhœa, and as a result of instrumentation in the urethra, was explained by such vague and unsatisfactory terms as sympathy, reflex action, and metastasis. In the light of our present knowledge of the gonorrhœal process these hypotheses have no scientific worth whatever. The testicular inflammation results undoubtedly from the extension of the gonorrhœal process into the utriculus masculinus, and from there into the ejaculatory duct, the vas deferens, and testis. Though the anatomical and clinical facts thus far in our possession do not clearly show that the inflammation creeps step by step along the mucous membrane of the whole length of the vas deferens, there can be no doubt that such a pathological condition does take place. Reasoning by analogy in the light of the undisputed fact that the gonorrhœal process begins at the fossa navicularis, and passes backward by direct continuity of tissue, and not by jumps, to the bladder, it is fair to assume that this process further spreads along the whole length of the vas until it reaches, and in most cases localizes itself in, the testis. Why the whole length of the vas deferens is not rendered swollen, inflamed, and painful in each case, together with the testis, we cannot say. That the inflammation may be arrested along the canal at various parts there can be no doubt.

In the majority of cases of epididymitis, as we have seen, the gonorrhœal process first invades and localizes itself in the posterior urethra, from which it spreads to the testis. Jadassohn<sup>1</sup> and Neisser<sup>2</sup> both claim that the epididymis may be attacked, while the posterior urethra yet remains intact. Neisser says "that patients may suffer from epididymitis without there being any possibility of finding gonococci or even an inflammation in the posterior urethra, even if examinations are frequently repeated. I do not know how the gonococci get there, but the fact is certain." Jadassohn says: "The bacteria which have reached the posterior urethra may have been carried away by the stream of urine, whilst those already in the ejaculatory duct are safe in this respect; or by the inflammation of the epididymis the catarrhal process in the posterior urethra may have been brought to an end for a time or finally, as also happens in the anterior urethra." I have seen and carefully examined a case of epididymitis in which I could not at any time, even remote, discover any evidence whatever of involvement of the posterior urethra. So it may be that in some cases, as the infective process travels along the vas deferens toward the testis, it wholly ceases in the posterior urethra. We certainly see cases of men who after gonorrhœal epididymitis have no longer any urethral discharge, and never thereafter any relapse of their gonorrhœa.

<sup>1</sup> *Op. cit.*, pp. 188 and 189.

<sup>2</sup> "Zur Bedeutung der Gonorrhöischen Prostatitis," *Verhandl. der Deut. Dermat. Gesellschaft*, Wien und Leipzig, 1894, pp. 325 et seq.



There is very frequently in cases of epididymitis and epididymo-orchitis a swollen and painful condition of the vas deferens as it leaves the epididymis and ascends. This swelling of the vas may extend an inch and even more up the tube. It is usually lost sight of by reason of the greater prominence and painfulness of the testicular phlegmasia. Bergh of Copenhagen,<sup>1</sup> an acute and accurate observer, in two series of cases of gonorrhœal epididymitis, numbering in all 348, found coexistent localized involvement of the vas deferens in 182 cases. This same complication was studied by Hassing,<sup>2</sup> who found the proportion still higher.

Swelled testicle, therefore, may consist only of inflammation of the epididymis, but this is usually complicated with acute inflammation and more or less copious effusion into the cavity of the tunica vaginalis. This combination, with in some cases some involvement of the vas deferens, constitutes the majority of the cases of swelled testicle from gonorrhœa. The less common combination is inflammation of the epididymis and testis, in which case the tunica vaginalis is very apt to be affected, with perhaps a limited invasion of the vas deferens.

Until within the last few years the statement was made and quite generally accepted that swelled testicle appeared as a complication in the third week of gonorrhœa, chiefly toward its end, and then rather less frequently in the three following weeks. Cases, of course, were observed in which the complication appeared later. This statement, that the testicle became affected chiefly in the third week, was based on the erroneous idea that gonorrhœa, as a rule, travelled back leisurely, and if it reached the posterior urethra at all, it did so generally in the third week. This view has been shown to be incorrect (see page 123), since in most cases the onward advance of the gonorrhœal process is very prompt, and it is the rule rather than the exception that the posterior urethra should be attacked. The date of the onset of epididymitis has been carefully studied by Bergh in 926 cases, as will be seen in the following table:

*Appearance of Gonorrhœal Epididymitis.*

In the 1st week in	70 cases.	In the 4th month in	19 cases.
“ 2d “	229 “	“ 5th “	7 “
“ 3d “	176 “	“ 6th “	15 “
“ 4th “	135 “	“ 7th “	1 “
“ 5th “	79 “	“ 8th “	2 “
“ 6th “	52 “	“ 9th “	5 “
“ 7th “	39 “	In 1 year in	3 “
“ 8th “	23 “	“ 1½ years in	2 “
“ 9th “	32 “	“ 2 “	2 “
“ 10th “	11 “	“ 3 “	3 “
“ 11th “	12 “		
“ 12th “	9 “		926 cases.

In these 926 cases the testicular complication developed in the first three weeks in 475 cases, which is rather more than one-half of the whole number. Now, when it is remembered that gonorrhœa usually lingers for a day or two, and perhaps longer, in the prodromal stage at the fossa navicularis, it will be seen how promptly the testicle was attacked in so many cases in which we may deduct one, two, or, exceptionally, three days. All

<sup>1</sup> “Beitrag zur Kenntniss der Entstehung der Urethritischen Epididymitis,” *Monatshefte für Prac. Dermat.*, 1884, pp. 161 et seq.

<sup>2</sup> See Bergh's essay.

these figures are in support of the view that gonorrhœa promptly spreads backward and invades the posterior urethra. It does not follow, however, that the infective process will pass through the ejaculatory ducts and down to the testes. This further extension may perhaps depend on the condition of the openings of the ejaculatory ducts. If these openings are lax and patulous, the infection may readily pass into them and onward. On the other hand, if the calibre is small and they are tightly compressed, they may not offer a favorable condition to the spread of the inflammation. It is difficult otherwise, then, on these anatomical grounds to explain cases in which in every attack of gonorrhœa the testis is affected, and why in some cases where there has been no extraneous source of irritation or injury of the parts the extension of the phlegmasia has been so prompt. It must be remembered that in many cases the spread of the disease is due to hard work, violent exercise, to excesses, alcoholic and sexual, and to the intemperate use of very active treatment, perhaps with a view of aborting the disease.

Summing up the results of the observations of Bergh, which are fully in accord with my own, and which further have the support of the statistics furnished by Unterberger,<sup>1</sup> it may be said that within the first three weeks of gonorrhœa the testis is attacked in the majority of cases of swelled testicle, and that between the fourth and sixth weeks, inclusive, it is attacked rather less frequently. Thus there were 475 in the first three weeks, inclusive, and 266 cases between the fourth and sixth weeks, inclusive. These, therefore, are the periods in which acute gonorrhœal invasion of the testis most frequently occurs. When epididymitis develops after this period of six weeks, which corresponds to the period of decline of the gonorrhœa, it is usually the result of some extraneous influence acting on the disease in the posterior urethra.

Double epididymitis sometimes occurs, in which case usually the second testis is attacked from one to three weeks after the first one. In some cases, however, the second testicle is not involved until later—eight, ten, or even twelve weeks. An epididymis or testis once the seat of gonorrhœal inflammation is thereafter very liable to be affected with each repetition of the infection, and also when a chronic deep urethral inflammation undergoes an exacerbation and an acute condition results. Further than this, mechanical injury, over-exertion, undue pressure on the testis, may for years after light up a more or less severe recrudescence.

Cases have been reported by Castelnau, Vidal, and others in which epididymitis developed from three to ten days before the appearance of the urethral discharge. Bergh speaks of two cases in which epididymitis appeared in four and six hours after a violent coitus, and in which the discharge appeared several days later. These cases used to be looked upon as curiosities, and the pathological conditions underlying them were not clearly grasped. Their pathogenesis, however, is not difficult of explanation. In all such cases there has been a previous antecedent gonorrhœa which has left a latent posterior urethritis. In sexual and alcoholic excesses this latent condition becomes an acute one, and for some reason, perhaps anatomical, the phlegmasia travels through the ejaculatory duct into the testis before it spreads forward and invades the anterior

<sup>1</sup> "Zur Frage über den Zeitpunkt des Auftretens des Epididymitiden, etc.," *Monatshefte für Prak. Dermat.*, 1884, vol. iii. pp. 97 et seq.

urethra. As we have seen (see page 168), a latent posterior urethritis may undergo exacerbation, and the inflammatory process may in one or several days spread into the anterior urethra. There is nothing inexplicable or wonderful, therefore, in cases in which the testis is attacked before the urethral discharge appears.

In years gone by there was much discussion as to which testis, the right or the left, was more frequently the seat of gonorrhœal inflammation. It was claimed that the condition of the veins on the left side, and the fact that men "dressed" on that side, tended to produce inflammation in that testis. Others, again, claimed that the right testis was more frequently affected than the left. It seems strange that such a minor point should cause so much discussion and give rise to such a formidable array of statistics as it did. From my own experience I am inclined to agree with Bergh, who has gone quite carefully over the subject, and who says that on an average both epididymes are attacked in about the same proportion.

There is great discrepancy in the statements of authors as to the frequency of swelled testicle in gonorrhœa. The truth is, that no general statement can be made. Hospital statistics always show a large percentage, for the reason that in very many cases poorer patients, owing to the severity of the affection, are forced to enter them. In dispensaries and clinics the proportion is also quite large, but patients who frequent them are men who have to work hard and cannot spare themselves, who are careless in their habits, perhaps given to drink, and who often induce the disease by the intemperate use of balsamics and injections.

In private practice, particularly among the middle and upper classes, swelled testicle cannot be said to be common. As a general rule, it may be said to depend very largely on the method of treatment followed. Active interference in the acute stage, aggressive attempts at aborting the disease, the too early use of balsamics and strong injections, are the underlying causes of many cases of swelled testicle. On the other hand, a mild and palliative treatment in the acute stage tends to make the percentage of these cases quite small. Bergh is disposed to think that in private practice in each 100 cases of gonorrhœa 7 will become affected with swelled testicle. In my judgment and experience this percentage is far too high: I think even 3 per cent. a high figure.

**Symptoms.**—Before the onset of the affection the urethral discharge usually, but not always, ceases, and patients complain of varying symptoms. In some a pain in the groin, at the external ring, and along the vas deferens, either in the external or in the pelvic segment, is complained of. In somewhat rare cases pain is experienced in the whole length of the vas deferens. Some patients even complain of a pain which reaches to the kidney. In some cases the pain seems to be at first in the deep urethra or in the seminal vesicles, and these patients sometimes suffer from pollutions which may be painful and bloody. The most common history given by patients is that they felt at first a dull pain and a sensation of weight in the scrotum, which they perhaps attributed to cold or to a strain or jarring motion. In general, there are no premonitory constitutional symptoms, but as the intensity of the inflammation increases a chill and fever of various degrees, with malaise, want of appetite, great thirst,



a frequent desire to urinate, and perhaps constipation, may supervene. As a rule, the systemic reaction is not great, but in very severe cases, and particularly those in which the vas deferens is involved, there may be well-marked fever with all its concomitants—namely, hot skin, coated tongue, rapid pulse, together with nervousness and agitation. In some rare cases there are nausea and vomiting. The invasion of the affection may be prompt or slow. Many patients walk and attend to their duties with mild and bearable discomfort for one or more days before they are forced to assume the recumbent position. In other cases, particularly those in which one or more exciting causes are active, the affection is well under way and the patient on his back within twenty-four hours. Early examination of a case shows that the epididymis, with perhaps the vas, is swollen and painful, and that the scrotum over it is somewhat reddened. In some cases the pain and swelling are confined to the globus minor or tail of the epididymis, which becomes of the size of a hickory-nut, and the affection may thus be limited: usually, however, the body and globus major or head of the organ are promptly involved. Then a large tumor is found seated superiorly and posteriorly to the testis, and the furrow which naturally exists between that organ and the epididymis may be present or it may be obliterated. The shape of the tumor varies in different cases. The epididymis, becoming enlarged, may cover the testis like a cap, or it may grow longitudinally and form a semilunar tumor, which rests on the organ like a crest on a helmet, the head of the appendage reaching well forward and the tail well upward. There is also usually more or less lateral expansion of it, sometimes almost enveloping the testis. Pressure on the testis in such a case usually causes no pain, but when the swollen epididymis is held between the thumb and fore finger the patient winces or cries out. While at rest in the horizontal position, with the scrotum well supported, the patient may be tolerably comfortable. Coincidentally with this inflammation, the scrotum on the affected side becomes of a deep, even purplish, red, very much swollen from œdema, and adherent to the testis. Pain is at this time severe, sometimes almost unendurable, and continuous, with paroxysms at night. Slight motion tends to increase the patient's sufferings, and pressure even of the bed-clothes causes agony. Coincident involvement of the cord is attended with a still greater amount of pain, which extends up to the inguinal canal. In these very severe cases the testicle is also, as a rule, the seat of inflammation. When the epididymis alone is inflamed, the swelling is very considerable, but when it and the testis are involved, it is great, so that a tumor of the size of a small fist is formed. The testis will be found to be very painful and tender, and a much larger area of the scrotum will become inflamed, thickened, and of a deep red. While at first there is only moderate and localized adhesion of the upper portion of the organ to the scrotal wall, when epididymo-orchitis is present there is adhesion of a large surface corresponding to the size of the swollen testicle. In proportion as the testicular inflammation is great, the tunica vaginalis becomes affected and the seat of serous effusion, by which the size of the tumor is materially increased. With this concomitant the acme of the inflammation may be said to be reached. The patient then will complain of pains in the perineum, in the thighs, the groins, and the lumbar regions. In some cases patients complain bitterly of deep

pelvic and rectal pains, which are due to a complicating inflammation of the seminal vesicles.

In the acute stage particularly, and also in the period of decline of epididymo-orchitis, examination of the prostate, and sometimes the seminal vesicles, by means of rectal touch will in many cases reveal swelling and congestion of that organ, sometimes in its totality, and again on the side corresponding to the testicular inflammation. Lucas<sup>1</sup> in 285 cases examined found that in 174 there was no perceptible change in the prostate, and that in the balance the organ was more or less swollen and painful.

In its full height swelled testicle consists of inflammation of the epididymis, of the testis proper, of the tunica vaginalis, which is the seat of effusion, and of exudative oedema of the subscrotal connective tissue and of the scrotal wall, with perhaps inflammation of more or less of the cord. At this time it is difficult to detect fluctuation in the hydrocele unless the effusion is very copious. The tissues are too hyperæmic and opaque to admit of the light test for translucency. This hydrocele is due to inflammation of the tunica vaginalis testis, and is called vaginalitis. This complicating extension of the gonorrhœal process, although a very frequent, is not a constant, symptom, and is always consecutive to the inflammation of the epididymis. There is commonly an effusion, varying in quantity and character, within the tunica vaginalis. This may consist only of serum, and be apparently due to simple obstruction of the circulation, or it may contain fibrin and other products of inflammation. Sometimes bands of lymph bind the two opposed surfaces together, as in pleurisy. The subscrotal cellular tissue also participates in the inflammatory action, and is thickened by oedema or fibrinous deposit. As a rule, well-marked swelled testicle reaches its acme within forty-eight or seventy-two hours.

Much depends in these cases upon the vigor and efficiency of the treatment, which may prevent the affection from reaching the point of full development, and which will usually superinduce the stage of decline. Swelled testicle may exist in a severe form from one to five days in untreated cases, when subsidence of the inflammation begins. In carefully-treated cases the intensity of the symptoms need not last longer than twenty-four or thirty-six hours. The first symptom of improvement is amelioration of the pain, and soon it is noticed that the patient can move in bed with more freedom than before. The redness and oedema of the scrotum become less, and its adhesion gradually passes away, and the swelled organ becomes smaller and can be more freely manipulated. The swollen epididymis may be quite clearly made out, the testis can be distinctly felt, and if any hydrocele is present it may be detected by palpation or perhaps by the light test. At this time the general health of the patient will improve; he will lose his anxious look, drink less of fluids, and ask for food. As a rule, the course of swelled testicle in bad cases occupies from ten to fourteen days, during which time the patient will have been confined to his bed. At the end of this time, though he may go about, he is far from well, and should be looked after with the most careful attention. Unless removed by tapping, the hydrocele remains for a long period, and while it does the testis remains swollen and tender. When there is no hydrocele the testis is found to gradually become smaller

<sup>1</sup> *Thèse de Paris*, 1894.

and softer, and soon the line of demarcation between it and the epididymis can be made out. During this period of involution the epididymis also grows smaller, but much more slowly, and for longer or shorter periods it is found to be enlarged and indurated. Its continuance in this state is governed largely by the duration and intensity of the inflammation. With the œdema of the part there is cell-exudation, and the future of the case depends on the extent and severity of this morbid condition and whether it is appropriately treated. So rapid and complete is the involution of the swelling of the epididymis in some cases that it seems scarcely credible; in others it is slow, occupying several months; while in others permanent enlargement and induration are left. In severe cases—luckily, not common—the testis, tunica vaginalis, epididymis, and vas deferens are left in a state of induration and chronic subacute inflammation.

During an acute attack of swelled testicle the sufferings of the patient, as in gonorrhœa, are sometimes increased by the occurrence of nocturnal emissions.

As a rule, the first attack of swelled testicle is the most severe, and it renders the patient very liable to relapses. The affection is usually unilateral, though rarely both testes are involved. Exceptionally, inflammation of one organ is followed by that of its fellow, and this condition is called see-saw epididymitis, the *epididymite à bascule* of Ricord.

Much gradation in intensity is observed in swelled testicle. Some patients simply complain of a little uneasiness and heaviness in the scrotum, and the surgeon is the first to find the epididymis more or less enlarged. Other patients present more marked subjective symptoms, with moderate epididymitis and often involvement of the testicle, yet by means of medical applications and with the support of a suspensory they are able to go about with moderate freedom. Resolution of the inflammation also varies considerably in different subjects. In some cases with very little care the testis soon returns to its normal state, while in others it is slow, in spite of the most careful treatment.

In a normally-placed testis little difficulty is experienced in determining the extent and localization of the inflammation, but it must be remembered that exceptionally there exist malpositions of the epididymis, when confusion may occur. The most common form of malposition is where the epididymis is placed anterior to the body of the testis, in which the features observed in the normal testis would be reversed. Then it may be seated on one side, either external or internal, in which event the diagnosis need not be difficult. In the third variety the epididymis and vas deferens are attached superiorly, the long axis of the testis being in the antero-posterior direction. In a fourth variety the epididymis and vas deferens form a loop or sling from before backward around the testis. It is always important to make a correct estimate of the position of the parts, particularly if puncture of the tunica vaginalis is decided upon. It is a good rule to find the vas deferens high up in the scrotum, and if practicable trace it downward between the tips of the thumb and fore finger.

Sometimes, even when the epididymis is normally placed, its weight and bulk are so much increased by inflammation that it falls downward and forward with the testis above it. Examination then reveals the tail of the epididymis anteriorly and the head posteriorly, the organ hanging



antero-posteriorly in the scrotum. Then, again, owing to the heaviness of the epididymis, it sinks down to the bottom of the scrotum, and the testis then lies directly on top of it.

Gonorrhœal inflammation, when it attacks an undescended or misplaced testis, has frequently been unrecognized. Berkeley Hill speaks of the case of a young man suffering from gonorrhœa, obstinate constipation, stercoraceous vomiting, fever, and great abdominal tenderness, particularly in the left iliac region. The right testis was found in the scrotum, but the left one could not be discovered. After death, from peritonitis, a small inflamed testis was found close to the internal ring. Undescended testis in the inguinal canal need offer no diagnostic difficulty. Ricord mistook a perineal swelling for abscess of Cowper's gland, but examination of the scrotum showed absence of one testis, and a diagnosis of misplaced and inflamed testis was made. An interesting case of testis in perineo, complicated by congenital inguinal hernia and acute orchitis, is reported by Dr. J. A. Williams,<sup>1</sup> who gives the bibliography up to the date of his essay, with a synthetical table of the cases. Gosselin reported the rare occurrence of gonorrhœa attacking the epididymis seated in the scrotum while the testis was retained in the inguinal canal, in which the first diagnosis was epiplocele.

It very often occurs, as pointed out by Le Double,<sup>2</sup> that in patients having varicocele, inguinal hernia and ectopia of the testis, epididymitis develops on the side on which either of these conditions exists. Of 14 cases of hernia observed by Le Double, the epididymitis appeared on the affected side in 12 cases. In 8 out of 9 epididymitis developed on the side on which the varicocele was present. In these cases the testicular trouble often aggravates the condition of the varicocele, while the latter may tend to induce atrophy of the testis.

Statistics seem to show that swelled testicle occurs more frequently on the left than on the right side, presumably, according to some authors, from the fact that men usually "dress" on this side. As to the frequency with which different tissues of the testis are attacked, the statistics of Sigmund show that in 1342 cases of swelled testicle the epididymis alone was involved in 61; the epididymis and tunica vaginalis in 856; the epididymis and cord in 108; and these three parts together in 317.

Gonorrhœal inflammation of the vas deferens outside of the inguinal canal, without involvement of the corresponding testis, is a rather rare complication. In the three cases which I have seen there was a fusiform or cylindrical swelling of the size of one's finger or of a sausage, beginning at the external ring and ending near the epididymis. The overlying skin was hot, red, rather œdematous, and not freely movable over the inflamed cord. There was moderate fever in two cases, and the pain was severe; in the third case the febrile symptoms were well marked, and the patient vomited and was much constipated. These symptoms, in addition to which the patient said that he first experienced pain after prolonged coughing, led my house-surgeon to think the case was one of hernia. The existence of a discharge led to inquiries, which settled the diagnosis, which was further confirmed by palpation.

<sup>1</sup> *The British Med. Journal*, July 21, 1883.

<sup>2</sup> *De l'Epididymite blennorrhagique dans les Cas de Hernie inguinale de Varicocele ou d'Anomalies de l'Appareil génital*, Paris, 1879.

Gosselin reported a case in which the swelling began below the external ring and extended to the level of the head of the epididymis. It was of the size of a hickory-nut, hard and painful, and from it a cord of the size of a goosequill stretched to the tail of the epididymis. Above the tumor the vessel was hard and cord-like.

Localized inflammation of the vas deferens within the pelvis sometimes occurs, and causes much deep-seated pain during acute gonorrhœa. In some cases the swelling can be made out by physical examination. In other cases the swelling is inaccessible, but the history of the case and the symptoms point to involvement of the vas. Sometimes the surgeon suspects the case to be one of intra-pelvic abscess. In very exceptional cases a considerable part of the pelvic portion of the vas may be involved. Mauriac<sup>1</sup> reports the case of a man suffering from acute gonorrhœa in whom the vas could be felt as a hard, painful cord, and, owing to the extreme leanness of the patient, it could be followed into the pelvis. By the finger-tip in the rectum the seminal vesicle of the same side was found to be swollen.

Induration of the epididymis may exist without impairment of the function of the testis. In some cases so copious and dense is the proliferation of cellular tissue that constriction, even to the extent of obliteration of the vasa efferentia, is produced, rendering the testis sterile. This is especially to be feared when the globus minor is involved, since at this point the tubes unite into one, whereas at the globus major there is a multitude of minute efferent vessels, some of which may escape. Unilateral induration of the globus minor may cause obliteration of the deferent duct and sterility of one testis. When it occurs on both sides, absolute sterility may be produced, but, as a rule, such patients have their usual sexual desires, and their erections and ejaculations are complete. Their semen, however, is entirely wanting in spermatozoa. Further, the size and consistency of the testes remain as before, and atrophy is very rarely produced. It has been observed that in favorable cases treatment has more or less perfectly removed the induration, and that the spermatozoa have again been found in the semen.

Atrophy of the testes has been known to occur in a few cases following epididymo-orchitis, and hypertrophy is not very uncommon, particularly in subjects who have had repeated attacks of the affection. I have seen two well-marked cases of atrophy due to acute urethritis, and Róna<sup>2</sup> has published an interesting case of this complication.

Abscess of the testis is a not frequent complication of gonorrhœal epididymo-orchitis, the focus of the trouble being usually in the epididymis. It should be promptly opened and the wound treated antiseptically. otherwise fistulæ and fungous growths are liable to form. It does not, of necessity, follow that the vas deferens will be occluded. In these cases of abscess of the epididymis or testis following gonorrhœa a suspicion of tuberculosis is warranted, and the patient should be well looked after and placed in the best of hygienic conditions. Cysts in the epididymis sometimes follow swelled testis, and are sometimes the seat of acute pain, and may be mistaken for circumscribed abscesses.

Abscess of the body of the testis somewhat rarely occurs during gon-

<sup>1</sup> *Annales de Dermat. et de Syphiligraphie*, No. 6, 1891, pp. 467 et seq.

<sup>2</sup> *Monatshefte für Prak. Dermat.*, vol. v., 1886, pp. 360 et seq.

orrhœal epididymo-orchitis. An incision should be made as soon as fluctuation is discovered. In some cases the wound heals and the integrity of the organ seemingly remains. In other cases a hernia of the testis tissues occurs, and protrudes as a fungous mass from the opening in the scrotal walls. In some of these cases the morbid process may be of a benign character and the mass may be due to simple hyperplasia. In some cases tuberculosis may be present. Consequently, all such cases should be carefully examined and watched.

Chronic hydrocele is frequently caused by swelled testicle. Vétault thinks that the effusion is due to congestion of the vessels of the tunica vaginalis, caused by presence of the indurated tissue in the head of the epididymis. It is also probable that the acute inflammation during gonorrhœa leaves a tendency in the vessels of the testis and the tunica vaginalis to engorgement and consequent effusion of serum.

Gangrene of the scrotum is a somewhat rare complication of swelled testicle; and of it I have seen two cases—one in a diabetic patient, and the second in a man suffering from Bright's disease. It usually begins, particularly in cases which have been poulticed, at a dependent portion of the sac as a black spot, which spreads and destroys more or less of the walls, laying bare the testis or testes, which, however, are not invaded. After the cessation of the gangrene the parts usually heal and cover the organs again, unless the destruction has been very extensive.

Gangrene of the testicles is a very rare complication of acute gonorrhœa. Bogdan<sup>1</sup> reports a case in which both testicles were destroyed by gangrene. Gangrene of the scrotum may follow gangrene of the testes.

In a case of acute gonorrhœa Samter<sup>2</sup> observed the development of trismus, for which no other etiological cause than the urethral inflammation could be ascertained.

Neuralgia is a not uncommon sequela of swelled testicle. It may exist as a slightly painful sensitiveness of the organ and along the cord, particularly on pressure or during active motion, or as a distinct dull pain subject to irregular and fugitive paroxysms. Usually, in these cases the epididymis is found to be enlarged and very sensitive. It is commonly seen in weak, sickly subjects, particularly those of neuropathic tendency, and subjects given to worry and fretting.

Reflex neuralgias, first fully described by Mauriac,<sup>3</sup> are not infrequent complications and sequelæ of swelled testicle. The pain is generally unilateral and confined to the territory supplied by the lumbar and sacral nerves of the affected side, but may cross the median line and extend in various directions. Spinal pain, seated at the junction of the lumbar and sacral plexuses, is sometimes complained of, and it may be bilateral and more severe on the unaffected side. Deep-seated pain, as if in the kidneys, extending from the ribs to the sacrum, pains radiating from the lower part of the lumbar portion of the cord and radiating upon the abdomen and lower extremity, and a sense of a constriction encircling the body under the level of the umbilicus, are also sometimes experienced.

<sup>1</sup> *Annales de Derm. et de Syph.*, 1893, pp. 1211 et seq.

<sup>2</sup> *Berl. klin. Wochenschrift*, 1889, No. 9.

<sup>3</sup> *Étude sur les Néuralgies réflexes symptomatiques de l'Orchi-epididymite blennorrhagiques*, Paris, 1870.



Pains and vague unpleasant sensations are felt at spots along the intercostal nerves and in the course of their distribution.

The pains affecting the leg are not uncommon, and they may be seated in the anterior crural or posteriorly in the sciatic nerve. The pains in the anterior crural nerve involve the anterior aspect of the thigh as far as the knee, rarely below that, though Mauriac says that the internal saphenous nerves may be the seat of pain. The pains in the sciatic nerve are referred to the sciatic notch, from which they may extend forward to the great trochanter or downward to the popliteal space. In many cases they are limited to the buttocks and postero-external portion of the thigh. The pains may be of a neuralgic character, continuous or with exacerbations, sometimes of a fulminating character, and remissions, or may exist as more or less extensive hyperæsthesia of all those parts supplied by the lumbar and sacral nerves and their branches.

The intensity of these pains sometimes amounts to agony, and they cause insomnia, nervous excitement, and prostration and emaciation: they may last several days or several months, but in the end they cease. It is frequently observed that a relapse of the epididymo-orchitis is accompanied or followed by some neuralgic manifestations. Such morbid phenomena emphasize the necessity of careful and intelligent treatment of the testicular lesion.

Patients who have suffered from epididymitis, particularly those in whom relapses have been frequent and whose epididymes are thickened, are prone to engorgement and gummatous infiltration of these parts if they subsequently contract syphilis. The same tendency is observed in cases in which the testis proper has been inflamed during gonorrhœa. Chronically inflamed and indurated epididymes sometimes become the seat of caseous degeneration, and in sickly, scrofulous, and tuberculous subjects tuberculosis may attack them.

### Orchitis and Epididymo-orchitis occurring in the Course of Various Diseases.

Inflammation of the testicles, alone or in combination with epididymitis and vaginalitis, may also occur as a complication of a number of infective diseases.

In the course of mumps the testicle may become painful, swollen, and hard. The affection called mumps, or parotidean orchitis, may be limited to the gland and it may involve the epididymis and the tunica vaginalis. The onset of this inflammation is brusque and its course rapid, so that in from three days to a week it may cease. Involvement of the second testicle sometimes occurs. In this form of orchitis resolution may be perfect, but not uncommonly total atrophy occurs.

Under the title *orchite amygdalienne*, or tonsillar orchitis, French authors<sup>1</sup> have described an acute and ephemeral orchitis in men suffering from tonsillitis. The onset of this affection is sudden, its course rapid, and resolution may take place within a few days. The affection is observed in adolescents, and is usually unilateral. It may result in

<sup>1</sup> Verneuil, "Les Épanchements dans la Tunique vaginale, métastatique de l'Arrière bouche," *Archives gén. de Médecine*, 1857, and Joal, "Orchite et Ovarite amygdalienne," *ibid.*, 1886, vol. xviii. pp. 678 et seq.

abscess and atrophy. According to Monod and Terrillon,<sup>1</sup> this orchitis is an anomalous form of mumps-orchitis.

During the course of small-pox the testicle, its envelope, and its appendages may be attacked with more or less violent inflammation. This complication may occur in men who have previously suffered from gonorrhœa and in those who have not. According to Béraud,<sup>2</sup> whose essay is admirable in every respect, the affection is usually unilateral, of ephemeral duration, and is not followed by any serious consequences or permanent lesion.

It is the consensus of opinion of authors that orchitis is not a common complication of small-pox. In 432 cases observed by Curschmann<sup>3</sup> it was present 4 times.

This complication has been studied in an exhaustive manner, microscopically, by Chiari,<sup>4</sup> who found in fifteen cases of old and young subjects parenchymatous inflammation studded with colonies of cocci.

Orchitis accompanied by epididymitis and vaginalitis is a very rare complication of scarlet fever. Two cases have been reported as occurring in boys six and eight years old. In one case observed by Henoch<sup>5</sup> the tunica vaginalis was distended to the size of a fist. In Horteloup's<sup>6</sup> case the organ was much enlarged, and there was swelling of the epididymis and effusion into the tunica vaginalis. Resolution occurred in this case.

Orchitis may develop during the course of, or subsequent to, whooping cough. In a boy aged fifteen years, otherwise healthy, just recovering from this trouble, acute orchitis suddenly developed. This was accompanied by such alarming symptoms as stupor, delirium, very high temperature, and very rapid pulse, which lasted a short time and rapidly disappeared. The testes also underwent resolution. This case, reported by Pierse,<sup>7</sup> seems to be unique.

There have been so many cases reported in which orchitis developed during malarial fever, and for which no other pathogenic cause or condition can be assigned, that it seems reasonable to accept the latter as cause and the former as effect. One testis or both may be attacked. Magnani<sup>8</sup> reports two cases in which there was no evidence of gonorrhœal origin, and in which he thinks that the plasmodium of malaria was the pathogenic agent.

The cases reported by three French army surgeons—Bertholon,<sup>9</sup> Schmidt,<sup>10</sup> and Charvot<sup>11</sup>—stationed in Africa are very significant, since they were carefully observed for long periods. In these cases the epididymis was suddenly attacked, together with the testis, and sometimes the

<sup>1</sup> *Traité des Malad. du Testicule*, Paris, 1889, p. 369.

<sup>2</sup> "Récherches sur l'Orchite et l'Ovarite varioleuse," *Archives gén. de Médecine*, 1859, vol. xiii. pp. 274 et seq.

<sup>3</sup> *Ziemssen's Handb. der Spec. Path. und Therapie*, vol. ii., 2d part, 1877.

<sup>4</sup> "Orchitis variolosa," *Zeitsch. für Heilkunde*, vol. vii., 1886, pp. 385 et seq.

<sup>5</sup> *Berlin klin. Wochenschr.*, 1865, No. 12.

<sup>6</sup> *Dict. encyclop. des Sciences méd.*, 3d Series, vol. xvi. p. 578, art. "Testicule" (case of Augagneur and Mollière).

<sup>7</sup> *Lancet*, Aug. 3, 1889.

<sup>8</sup> "Sull l'Orchite d'origine pallustre," *Gazz. Med. Ital. Lombard*, 1887, vol. vii. pp. 415 et seq.

<sup>9</sup> "Orchites paludéennes primitives," *Archiv. de Méd. et de Pharm. milit.*, Oct., 1886.

<sup>10</sup> "Orchite paludéenne," *ibid.*, March, 1887.

<sup>11</sup> "Orchite paludéenne," *Annales des Malad. des Org. Gén.-urin.*, 1887, p. 733.

tunica vaginalis. The clinical picture was that of acute orchitis. The tendency of the disease is to quite prompt resolution, after which, in some cases, atrophy may occur and an indurated epididymis may be left. The pain incident to this inflammation is usually severe, sometimes continuous, and, again, it may be intermittent. Quinine has an excellent effect in aborting and causing the resolution of this inflammatory process.

Mazel<sup>1</sup> reports two cases in which the epididymis and the vas deferens became acutely inflamed in malarious subjects, and in which also quinine produced excellent results. Southern surgeons who practise in malarious districts of this country from time to time meet with orchitis as a result of malarial infection.

There is abundant evidence to prove that influenza, or *la grippe*, may be the exciting cause of orchitis in subjects who have never suffered from gonorrhœa or any phlegmasia of the urinary tract. This infectious disease also has been known to cause recrudescences of epididymitis and orchitis in organs previously the seat of gonorrhœal inflammation. The physical signs generally are those of acute gonorrhœal inflammation, but as a rule resolution occurs more promptly. Zampetti<sup>2</sup> reports three cases of orchitis, in one of which there was a testicular abscess caused by the grip. Other cases with satisfactory histories have been reported by Harris,<sup>3</sup> Briscoe,<sup>4</sup> and Kelly.<sup>5</sup> In most of the published cases the physical signs are those of acute gonorrhœal orchitis. In some cases the phlegmasia seems to be greatest when limited to the testis proper. In other cases the tunica vaginalis and epididymis are involved. Thus Fliessinger<sup>6</sup> reports the case of a boy nine years old who had very severe vaginalitis, with three distinct exacerbations during its course, and the inflammation in the last outburst invaded the epididymis. Walker<sup>7</sup> reports a still more severe case in a man twenty-four years old, in whom a suppurating vaginalitis led to gangrene of the testes.

That the epididymis alone may be attacked is well shown in a case reported by Lamarque,<sup>8</sup> in which double epididymitis attacked a man during the decline of an attack of influenza. In this case there were absolutely no gonorrhœal antecedents.

In some cases of grip-orchitis there is a mild muco-purulent urethral discharge. Lamarque reports such a case, which was in no way dependent upon gonorrhœa.

When uncomplicated these testicular affections due to grip run an acute course and quite rapidly go on to complete resolution.

During the course of pneumonia and for some time after its defervescence inflammation of the testicle or epididymis may occur as a result of that infective process. I have recently had in my hospital service the case of a man in whom a destructive abscess of the testicle occurred, for which no other origin than pneumonia could be ascertained. In this case there was no antecedent gonorrhœa nor testicular affection. Prioleau<sup>9</sup>

<sup>1</sup> "Funiculo-epididymite paludéenne," *Journ. de Méd. et Chir. pratiq.*, Feb., 1889.

<sup>2</sup> *Gazz. degli Ospidali Milan*, 1890, vol. xii. p. 578.

<sup>3</sup> *Lancet*, vol. i., 1892, p. 22.

<sup>4</sup> *Ibid.*, p. 193.

<sup>5</sup> *Ibid.*, p. 359.

<sup>6</sup> *Gaz. méd. de Paris*, Feb., 4, 1893.

<sup>7</sup> *Correspond. Blatt. für Schweiz Aerzte*, Aug. 1, 1890.

<sup>8</sup> "Complications génito-urinaires de la Grippe," *Annales des Mal. des Organ. Gén.-urin.*, Sept., 1894.

<sup>9</sup> *Le Mercredi médical*, 1894, No. 36, p. 439.



reports the case of an old man in whom suppurating orchitis developed in the interval of two attacks of pneumonia. In my case and in that of Prioleau there were concomitant chills and fever. In the pus of my case pus-cocci were found, and in the pus of Prioleau's case diplococci were discovered.

Testicular inflammation<sup>1</sup> occurs somewhat rarely during the course of typhoid fever, Liebermeister having found 2 instances in 200 cases. Generally, it is toward the end of the fever that the epididymis is attacked, either in a subacute or a brusquely acute manner. There is usually a concomitant rise in the temperature and an ephemeral return of the general symptoms. In some cases this complication appears early in the disease, and in others after full defervescence and cure.

Usually this form of epididymitis is unilateral, and resolution takes place slowly, leaving no trace after it. Then, again, induration has been known to follow. In some cases the testis and vas deferens are attacked. Jaccoud<sup>2</sup> reports a case of suppurative orchitis in a typhoid-fever patient. Abscess of the testicle, however, is not common. Hanot<sup>3</sup> reports a case in which abscess began in the epididymis and led to the destruction and extrusion of the testicle. In another case reported by Hanot<sup>4</sup> atrophy of the testis occurred.

Jaccoud and Kocher<sup>5</sup> claim that they have found the typhoid bacillus in the pus of typhoid orchitis.

Several cases have been reported in which during typhoid fever chronic urethritis has undergone recrudescence, and epididymo-orchitis has resulted.

It is claimed by some that inflammation of the testicle may occur during the course of acute articular rheumatism. This assertion is made on the basis of cases reported many years ago. The reader desiring further information is referred to the essays of Stoll<sup>6</sup> and Bouisson,<sup>7</sup> if they are accessible to him, though they are not to me. The essential lesion is said to be an acute vaginitis. I have never seen such a case, nor has one been reported within this generation.

The same doubt exists as to the etiological relation of gout to testicular inflammation. Cases have been reported in support of this relationship, but they are so lacking in essential detail as to the previous history of the patient and to the pathogeny of the affection itself that I deem it wise not to quote them. Here, then, is a field for careful and discriminating clinical observation.

During the course of pyæmia and of grave phlegmonous inflammation in bones orchitis may supervene.

### Epididymo-orchitis from Operations in the Urethra.

The introduction of bougies, sounds, and catheters for various conditions is not infrequently followed by epididymitis or epididymo-orchitis.

<sup>1</sup> In the *Revue de Médecine*, Paris, Oct. and Nov., 1883, Ollivier gives the results of the study of twenty-seven cases.

<sup>2</sup> *Annales des Mal. des Org. Gén-urin.*, vol. ix., 1891, p. 262.

<sup>3</sup> *Société anatomique*, 1873.

<sup>4</sup> *Archiv. gén. de Méd.*, vol. ii., 1878.

<sup>5</sup> *Op. cit.*, pp. 265 et seq.

<sup>6</sup> *Encyclopédie des Sciences méd.*, Paris, 1837, 7th division ("Méd. pratique," by Stoll, p. 234, quoted from Monod and Terrillon).

<sup>7</sup> *Montpellier médicale*, 1860, vol. iv., p. 336, quoted as above.

In the course of gradual dilatation for stricture and for chronic urethritis, as a result of catheterism in retention of urine in acute gonorrhœa, and in the retention which sometimes follows severe operations, chiefly about the rectum and abdomen, and also elsewhere, inflammation of the testicle sometimes occurs. In young and old subjects, upon whom lithotrixy,<sup>1</sup> litholopaxy, and lithotomy have been performed, the testicle may become damaged. This accident not infrequently occurs when a catheter or other instrument is tied in the bladder.

In cases of hypertrophy of the prostate, in which the necessity for the introduction of the catheter is more or less urgent, testicular inflammation is not very uncommon. In many of these cases the testicular complication may be traced to the use of a too large catheter, to one which has by age become rather rough, and often to dirt which has been carried on the catheter owing to the patient's carelessness.

While, in general, the symptoms of this, as we may call it, traumatic epididymo-orchitis resemble those of gonorrhœa, they present certain somewhat distinctive features. As a rule, the testicular inflammation comes on quite promptly after the receipt of the injury. Then, again, the onset may not occur for several days, and then may be slow, halting, and intermittent. In the cases where the inflammation is slow in development its course is usually prolonged, and resolution comes on rather tardily. In some cases, however, the invasion is rapid and brusque, and in these particular cases we not unfrequently observe quite prompt, even markedly rapid, resolution.

The **physical signs** differ in various cases according to the mode of invasion. In the slowly-developing cases the patient may suffer little pain, and may discover, sometimes by accident, that the tail or head of the epididymis is somewhat swollen, hard, and perhaps a little tender on pressure. The swelling may then increase slowly, limited to one part of the epididymis, or it may spread and involve the whole of it. It then feels like a hard, firm, quite bulky crescent seated on the testis. This condition may remain indolent for a varying period, and it may quite fully disappear, or it may lead to a permanent swelling and induration of the epididymis. There may be a moderate effusion into the tunica vaginalis.

The **course** of the cases in which the onset is brusque and rapid is, in the main, quite like that of acute gonorrhœa. Abscess, however, is more frequent than in the latter condition.

In a goodly proportion of young and middle-aged patients this post-instrumental inflammation is limited to the testicle, with sometimes the involvement of the tunica vaginalis. In a rather larger proportion the epididymis is attacked. In elderly and very old men, while the process may be limited to the epididymis, it more commonly attacks the testis also. In these cases the epididymo-orchitis may be slow in development or the onset may be quite rapid. When the testis is involved there is usually much pain.

Abscess of the epididymis, of the tunica vaginalis, and particularly of the parenchyma of the testis, is a not uncommon accident. Abscess of the testis in old men may lead to the total extrusion of the gland and

<sup>1</sup> According to Pilven ("Orchite consec. au Passage des Instruments," *Thèse de Paris*, 1884), Guyon observed testicular inflammation in 13 out of 188 cases of calculi in which exploratory or lithotrixy instruments had been used.

its appendages. This sequela may, but quite rarely, be observed in young and middle-aged men.

### Orchitis due to Muscular Contraction.

So many cases have been reported in which epididymitis and orchitis, separately or combined, have developed as a result of muscular injury—*orchite par effort*—that to-day this causative factor is quite generally admitted. In these cases the pain on the receipt of the injury may be at first slight, and may gradually become severe, or it may be violent and sickening from the first.

In most cases the left testis is affected, and the clinical picture resembles that of gonorrhœal inflammation of these parts.

There is considerable difference of opinion as to the mechanism of the traumatism in these cases, in which patients slipping with violence, lifting heavy weights, or by any means rudely shaken become attacked by testicular pain and inflammation.

According to Velpeau and Roux, violent contraction of the abdominal muscles, particularly of the fibres of the rectus abdominalis muscle, which are present in arched form over the cord at the external abdominal ring, injures the cord, and the inflammation then descends to the testis. This theory, for obvious reasons, meets with much opposition.

Another view is that advocated by Tillaux, who claims that the injury results from violent contraction of the cremaster muscle, which jerks the testis against the pillars of the external rings by what French authors call the *coup de fouet*, or whip-snap, action.

The most rational explanation of this action is that of Martin,<sup>1</sup> who says: "The spermatic plexus of veins is peculiarly under the influence of intra-abdominal pressure: the vessels are provided with but few and imperfect valves, are feebly supported by the surrounding tissues, and hence are especially subject to disease. This varicosity of these veins is one of the most common surgical affections, and the effect of the contraction of the abdominal parietes and the diaphragm upon these dilated vessels is so marked that succussion on coughing or straining in any way is sufficiently distinct to simulate that of omental hernia. Given, then, a sudden and violent increase of pressure in these vessels, it is perfectly possible to conceive that rupture may take place. . . . Such rupture would naturally take place in the cord, in the epididymis, or even in the substance of the testicle."

In addition to this action, I think that spasmodic contraction of the cremaster and of the fibres of the rectus muscle may also, in some cases, play an accessory part. In many cases of this form of epididymo-orchitis the patients have previously been free from venereal diseases, gonorrhœa especially. In some cases patients will absolutely deny any previous gonorrhœal infection. There can be no doubt that a latent subacute inflammatory condition of the testis or cord may be transformed into an acute condition by means of muscular traumatism. Duplay and his élève, Delome,<sup>2</sup> claim that the underlying causes in these cases are latent urethritis, cystitis, and prostatitis.

<sup>1</sup> "Epididymitis caused by Abdominal Strain," *Med. News*, Nov. 29, 1890.

<sup>2</sup> "De l'Orchi-epididymite prétendue par effort," *Thèse de Paris*, 1877.



This form of testicular trouble usually goes on promptly to resolution, though induration of the epididymis and enlargement of the testicle may result. Terrillon<sup>1</sup> has published a case in which atrophy of the testis occurred, which was attended with such severe pains that castration was resorted to. The microscopic examination of this testis showed the characteristic lesions of traumatic orchitis.

*Strangulation of the Testis and Epididymis from Torsion of the Cord.*—There are in medical literature less than twenty-five cases recorded in which the testicle, seated either in the inguinal canal or just in the scrotum, became acutely swollen and painful as a result of torsion of the spermatic cord. Of these cases the majority were those of boys from thirteen to twenty-one years old, while in the great minority were old men and young children. In most of the cases there is a history or evidence of undescended or imperfectly descended testis; consequently, as a rule, the swelling is found in the inguinal canal or just within the upper part of the scrotum. The objective symptoms are localized swelling, œdema, and redness. The subjective symptoms are varied, and they may point to strangulated hernia, traumatism, or inflammation of the appendix vermiformis. There are pain, some fever, and frequently constipation and vomiting, which, however, is not stercoraceous. As distinguished from hernia, it will be noted that the constipation is not so persistent, the shock is decidedly less, and there are no abdominal symptoms. The tumor is harder than that of hernia, and is absolutely without impulse and is irreducible. Though the position and quite sharp localization of the tumor, together with its history and concomitant symptoms, point very convincingly to the testis (and it is absent from the scrotum in the majority of cases), it sometimes happens that a diagnosis is not arrived at until an exploratory incision has been made. Then the testis and epididymis are found to be swollen, of a deep-blue or even black color from hemorrhagic infarction, and sometimes they are gangrenous. When the tumor is below the internal ring the finger-tip pressed over that part will show that the case is not one of hernia. Hernia may be found as a complicating condition of this accident to the testis.

The exciting **causes** of torsion of the cord are, in the main, excessive labor and violent and sudden strain. In some of the reported cases no exciting cause whatever could be ascertained, and in some instances the condition developed while the patient was asleep.

Usually torsion of the cord leads to destruction of the testicle. Van der Poel,<sup>2</sup> however, reports an interesting case in which this accident occurred at various intervals of time, and was promptly remedied by taxis.

The twist of the cord may be partial or complete, or the cord may be twisted several turns. The essential and underlying cause of torsion of the cord is due to disturbance in the development of the vaginal process of the peritoneum, in which the mesorchium is either too slender or too long, and hence does not give the testis the necessary amount of fixation. The mesorchium then allows greater movement than normal, and the testis

<sup>1</sup> "De l'Orchite par Effort sa Termination par Atrophie testiculaire," *Annales des Mal. des Org. Gén.-urin.*, vol. iii., 1885, p. 239.

<sup>2</sup> *Medical Record*, June 15, 1895. The reader is referred to this essay for a résumé of the published cases.

may, as a result, encounter difficulty in entering the inguinal canal and impediment in traversing it. When it is in the inguinal canal the flat condition of the testis militates against its replacement, and renders this impossible as soon as inflammation has become established.

When it occurs in the scrotal sac, torsion of the cord may be reducible. Hemorrhagic infarction of the testis and epididymitis calls for prompt incision and extirpation.

Neuralgia of the testis sometimes follows epididymo-orchitis and epididymitis. Usually but one testis is the seat of pain. In some cases the pain is in the testis itself; in others it is said to radiate and extend to the groin. The pain may be mild and constant, and readily made worse by exertion. In some cases the pressure of the clothes causes much suffering. Then, in other cases, the pain is severe and paroxysmal, with intervals of full comfort.

In many cases neuralgia of the testis is a distinct morbid entity, and in these cases treatment will usually give relief. But testicular pain and pain in the spermatic cord are often complained of by neurasthenic and neurotic patients and cranks in whom no treatment seems to do any good, and in whom no abnormality of the parts can possibly be discovered. Such patients, by reason of their complaints and importunities, act as thorns in the flesh of the surgeon. Happily, there are not many of them.

Neuralgia of the testis may depend on chronic inflammation in the posterior urethra, and also on the pressure on the nerves of the parts by the effused tissue.

It must be remembered that neuralgia of the testis may be symptomatic of stone in the bladder, various diseases of that viscus, and kidney disease.

Induration of the epididymis following gonorrhœal inflammation may be limited to the tail, to the head, or may involve the whole appendage. In some cases it is absorbed, and in others it remains permanently. It sometimes feels like a little mass of firm structure of rounded or ovoid shape when seated at either head or tail. In general, the swelling is not very large, but it may remain for a long period localized to the head, and be nearly as large as the testis. In some cases, when the whole epididymis is chronically indurated, it forms a half-moon-shaped mass whose bulk is greater than that of the gland. The most frequent form of induration of the epididymis is that in which the part is about as thick as a lead pencil or a peanut. It is hard to say which is most frequently found—induration of the head or the tail of the epididymis. Hard enlargement of the whole appendage is less common than the localized induration.

The surface of simple gonorrhœal induration of the epididymis is usually smooth or of rounding or wavy outline, in marked contrast to the nodulated and angular feel of tubercular epididymitis. In chronic syphilis the epididymis is sometimes enlarged in whole or in part, and the general outline of the swelling is much like that of the gonorrhœal affection.

In these cases the diagnosis depends very largely on the history of the cases and on the presence of concomitant lesions or of salient stigmata.

**Causes of Epididymitis and Epididymo-orchitis.**—Gonorrhœa being the predisposing cause, various exciting causes are often the starting-points

of the trouble. These are the early use of strong injections, particularly when used to abort the disease, and the premature administration of copaiba, cubebs, and oil of santal; indulgence in alcoholic stimulants; and sexual excitement, with or without coitus, since men, either from lust or with a mistaken idea that they may thus rid themselves of their trouble, often have connection while suffering from gonorrhœa. In the majority of cases, walking, activity in business, lifting heavy weights, pulling violently, dancing, riding, particularly on horseback, bicycling, and skating, are the immediate causes. Passage of sounds and catheters toward the decline of gonorrhœa is frequently followed by epididymitis. Consequently, such instrumentation should not be adopted in the declining stage of gonorrhœa, or when stricture of the urethra is followed by a mild and ephemeral epididymitis or epididymo-orchitis.

**Diagnosis.**—Commonly, no difficulty is experienced in the diagnosis of swelled testicle, since the history of the case and the nature of the lesion are so clear. In some rare cases of acute hydrocele doubt might exist, but it would be soon dispelled by a consideration of the history of the case and an examination of the parts. Swelled testicle, with redness and œdema of the scrotum, is said to have been mistaken for erysipelas of that pouch. Such an error will rarely occur, and with ordinary care will be promptly found out. Hæmatocele of the tunica vaginalis may at first resemble gonorrhœal swelled testicle, but the history of traumatism will settle the question. The same remarks apply to orchitis of traumatic origin.

In epididymo-orchitis, or epididymitis accompanied by inflammation of the cord as far as the external ring, a mistaken diagnosis of hernia may be made, particularly when there is much fever, with constipation and vomiting, as sometimes occurs. The error need not be of long duration, since in the scrotal lesion there is a history of gonorrhœa, while in hernia there is usually a history of a fugitive or permanent tumor in the groin, and perhaps of antecedent inflammation or strangulation of the hernial sac.

Epididymitis of a misplaced or undescended testis sometimes is difficult of recognition. In such cases the history of an urethral discharge should cause suspicion, when the examination of the scrotum will show absence of one testis. It must be remembered that the testis may be retained within the abdominal cavity, in the inguinal canal, and that it may be found in the perineum.

In all cases it is of importance to assure one's self of the relation of the epididymis to the testis, since puncture of the tunica vaginalis is so frequently necessary. It is important to ascertain whether inversion of the epididymis is present, since puncture under these circumstances might wound or destroy the vas deferens. In swelled testicle the seat of inversion the tumor is long antero-posteriorly, with the epididymis well forward and the testis under and rather behind it.

In cases of inflammation of the vas deferens it is well to seek it as it leaves the tail of the epididymis, and trace it until it will be found to be lost in the swollen meshes of the cord, since it may not be possible to examine it as it escapes from the canal. The diagnosis of these cases is more difficult when the portion of the cord between the external and internal rings is also swollen.



**Prognosis.**—The prognosis of swelled testicle from gonorrhœa is, in the main, good, since more or less complete resolution generally occurs. It depends, however, largely upon the promptness and efficiency of the treatment and on the nature of the patient. Careless habits, intolerance of restraint, and poor fibre tend to make the prognosis more serious. The occurrence of the various structural complications already detailed, and the supervention of the various neuralgias, of course make the condition more serious. The fecundity of a man is not imperilled by induration of one epididymis and the occlusion of its vas deferens, but the total occlusion of both of these ducts renders him sterile. Though his procreative power is lost, his ability to copulate remains. The question of the sterility of a man often becomes an important matter in domestic relations. It must not be stated with absolute positiveness that when no spermatozoa are found in the semen a man is absolutely sterile, since it may be that there is present a temporary stenosis due to exudation, and for the reason that under treatment resolution of the infiltration may be produced. It is only in cases where the semen examined over long periods is found to be wanting in spermatozoa that the existence of absolute sterility may be asserted.

The prognosis is always better when the lesion is seated in the head of the epididymis, and correspondingly worse when in the tail, since in that the spermatic vessels have converged to form one—the vas deferens. Since relapses of epididymitis frequently have their origin in chronic subacute, deep-seated urethral inflammation, their occurrence will suggest the necessity of the removal of the cause. Apart from the varying conditions of the morbid process as influencing the prognosis, the latter largely depends on the treatment of the testicular disorder in its declining and chronic stages. If in these periods active conservative treatment is followed, full resolution may be obtained in the majority of cases.

**Treatment.**—Absolute rest in bed is the first indication in the treatment of the severe form of gonorrhœal epididymitis. During the premonitory stage the sooner the patient takes to his bed the better for him. The next indication is to place the swollen organ in a position of rest and comfort; and for this the suspensory bandage is generally useless. A number of excellent procedures are at our command. The simplest is to form an immovable platform or shelf on which the organ may rest. This may be done with India-rubber adhesive plaster; and, though regarded as dirty and objectionable by some, it by a little trouble can be made cleanly and serviceable. A sufficiently long strip of adhesive plaster, three to five inches wide, is placed across the thighs of the recumbent patient so high up that its superior border touches his perineum, whose scrotum for the moment has been carefully lifted toward the body. While sufficient adhesive surface is applied to the thighs, that portion of the plaster which forms the bridge between them may be covered with gutta-percha tissue, which, being folded under, adheres to the adhesive plaster. We have thus a water-proof platform or bridge upon which the scrotum may be placed. The objection that this application involves the immobility of the patient has no weight, since he is better off in that condition.

The next method of fixing the testes is to take the heel of a good-sized firm stocking, upon one end of which two pieces of tape, seated

about one inch apart, are securely sewn, while on the other end two similar pieces of tape are sewn about three inches apart. A waistband having been put in place, the suspensory is applied to the scrotum with the two tapes, which are nearer together underneath, each one of which should be passed outward and upward over the thigh and pinned on the waistband at about the anterior superior spine of the ilium. The remaining or superior tapes are brought up on each side of the penis and fastened to the waistband in the median line.

The third efficient method requires a soft linen or silk handkerchief, which should be folded diagonally so as to form a triangle, in the centre of the base of which two pieces of tape are to be sewn. Having placed a firm waistband around the body just above the iliac crests, the scrotum is elevated and the centre of the base of the handkerchief triangle is placed in accord with the *raphé* of the scrotum. The tapes are carried around the thighs on either side, and are secured to the waistband near the iliac crests. Having thus rendered the bandage firm, the two outer ends of the handkerchief are brought upward along the folds of the groin and secured to the waist-bandage, while the apex of the handkerchief triangle is brought upward in the median line and also secured to the band. By these means the testes may be kept at rest and any form of application may be used.

What is known among athletes and actors as the jock-strap is also very useful in cases of swelled testicle either when the patient is abed or on foot.

The scrotum may also be supported by a wad of oakum or absorbent cotton placed between the thighs.

The next indication is to administer a brisk cathartic in the form of pills or a powder of from five to ten grains of calomel and bicarbonate of soda. The diet must be mild and sparing, preferably of milk or of toast and weak tea. In the acute stage anorexia is very common, and the thirst is great, for which Vichy, Apollinaris, Poland, and Stafford waters are very good. Little internal medication is necessary, though the mixture of bicarbonate of potassa with tincture of hyoscyamus, spoken of in the treatment of the acute stage of gonorrhœa, may be given. In nausea and sickness of the stomach medicine is not beneficial.

For the relief of pain, particularly at night, some preparation of opium may be used in the form of pill, suppository, or hypodermic injection. The resulting constipation should be attended to, if necessary, by enemas. I have found *pulsatilla* a very uncertain remedy in acute and painful swelled testicle, and far inferior to *laudanum* in small and repeated doses. Considering the infectious nature of the gonorrhœal swelled testis, it is very difficult to understand what action such a drug can possibly exert. Many cases of swelled testis, for unaccountable reasons, improve, and in such instances I have no doubt *pulsatilla* has got the credit of the amelioration of symptoms. *Salicylate of soda* has been exploited as a valuable remedy in these cases, but it has failed utterly in my hands to comfort the patient or affect the *phlegmasia* in any way. Henderson,<sup>1</sup> however, used *salicylate of soda* in twenty-grain doses, given three times a day, very successfully in three cases of gonorrhœal epididymitis. Other authors claim that they have seen beneficial effects follow its use.

<sup>1</sup> *Lancet*, Dec. 16, 1892.

In general, a strong lead-and-opium wash, perhaps combined with muriate of ammonia, and applied to the organ properly fixed on old linen or lint or absorbent cotton or gauze, is a most efficient and reliable remedy. At the onset of the affection ice, guardedly applied, may be tried. Small pieces may be placed in a bladder or in the India-rubber bag made for the purpose, and these should be placed on the testis, upon which several layers of linen or lint had been already laid. A little experimentation will soon determine how much intervening linen is necessary to produce benefit and avoid pain. In some cases this treatment, when thus used, is attended with amelioration of the patient's sufferings and a decrease in the intensity of the inflammation. In other cases, however, it cannot be borne. Its range of usefulness, therefore, is not great.

While some patients are benefited by cold applications, others require hot ones, the best of which are poultices of slippery elm or flaxseed, with which may be incorporated, in the proportion of 8 to 1, fine chewing tobacco, or of 16 to 1 of hyoseyamus, belladonna, or digitalis leaves. Should these narcotics produce exhaustion, sickness of the stomach, or other pathological effects, they must be abandoned. Dr. Bumstead thought well of the following, applied on lint to the scrotum:

Ry. Ext. belladonnæ,	ʒij ;
Glycerinæ,	ʒss ;
Aquæ,	ʒj.—M.

Also this :

Ry. Pulv. opii,	ʒij ;
Glycerinæ,	ʒj.—M.

When these prescriptions are used the scrotum must be enveloped in gutta-percha tissue or oiled silk, and held in place by a suspensory if the patient goes about.

The following ointments are often of service when spread thickly on lint:

Ry. Pulv. opii,	ʒij ;
Pulv. camph.,	ʒss ;
Vaseline or glycerinæ,	ʒj.—M.

And

Ry. Pulv. opii,	
Pulv. amyli,	āā. ʒj ;
Glycerinæ,	q. s.

Make paste of the thickness of tar.

Ichthyol pure or in ointment form (ʒij to ʒj cerate) has been recommended, but after several trials I have abandoned it.

When the intensity of the inflammation is on the wane, due to the use of either heat or cold, a more radical treatment may be followed. Every effort must be made to cure the inflammation of the deep urethra. One of the most beneficial is the application at white heat of Paquelin's cautery over the scrotum corresponding to the swelled testicle. The parts must first be shaved and thoroughly washed. The tip of the cautery may then be applied rapidly and but for a second or two in ten or twelve spots well separated from each other. The scrotum is then to be enveloped in ab-



sorbent cotton and put in a comfortable bandage. The cautery may be used every two, three, or four days. The effect will usually be promptly seen in the amelioration of the symptoms and the subsidence of the swelling.

Very much benefit and comfort can be obtained by the withdrawal of fluid from the cavity of the tunica vaginalis just as soon as it can be done. This should not be forgotten. A hypodermic syringe may be used.

Another method of treatment which has been employed, like the foregoing, in the declining stage in my ward at Bellevue Hospital with much benefit, is the application every day or two of a solution of nitrate of silver (60 or 120 grs. to the ounce of water). The whole of the affected side is painted and the parts treated as directed after the cautery treatment.

In my experience the best method of treatment is to apply heat or cold as the case indicates, then, when the inflammation is on the decline, to use the cautery or the nitrate of silver or perhaps iodoform ointment. When the patient is able to get around (and this treatment requires seven to twelve days) he may apply the opium ointment or paste, with as much compression of the testes as he can stand with comfort. Internally or by suppository opium may be used if necessary.

For the benefit of those who like to try various methods of treatment I describe in a few words those which are to-day most advocated, and I omit all old-time methods which have proved valueless:

Trzcinski, a Russian surgeon, uses nitrate of silver in the form of ointment (1 part to 10 of cerate or vaseline), together with a cotton compress, and claims that much benefit and amelioration of symptoms result.

Iodoform ointment (3ij to vaseline 3j) is sometimes very efficacious in the subsiding acute or declining stages.

Diday and Lardier recommend the application of carbolic acid in alcohol (1:10) as being of much benefit. This treatment is, however, so painful that, although it produces resolution of the swelling, it is not to be endorsed.

Thiéry and Fosse<sup>1</sup> advocate very hot vaporization or pulverization of carbolic acid and water (1:50), applied for twenty minutes two or three times a day. They consider this treatment analgesic, antiseptic, and resolute. It is said to give rise to no local or general accident.

Applications of solutions of carbolic acid in water (3ij to 3viij) on gauze, cotton, or lint are sometimes very soothing in the acute stage.

Ughetto<sup>2</sup> proposes a very radical treatment. He injects directly into the inflamed epididymis, by means of the hypodermic needle, a few drops of a 2 to 5 per cent. solution of carbolic acid in water, or a few drops of bichloride of mercury in water (1:1000), or a similar quantity of equal parts of tincture of iodine and glycerin. A cure is said to have followed in seventeen days.

Dr. Samuel Alexander<sup>3</sup> has recently quite warmly advocated a method of treatment first used by Dr. W. Boeck. This consists in injecting into the posterior urethra watery solutions of nitrate of silver, 1 to 3, and even 8, grs. to the ounce. Local and general treatment is also used.

<sup>1</sup> *Gazette méd. de Paris*, Nos. 44 and 45, 1891.      <sup>2</sup> *Il Morgagni*, Nov., 1892, p. 653.

<sup>3</sup> *Journal of Cutaneous and Genito-urinary Diseases*, vol. ix., 1891, pp. 455 et seq.

In France the method of Ducastel<sup>1</sup> is now somewhat the vogue. This is the so-called treatment by *stypage*, or local anæsthesia induced by refrigeration due to the evaporation of methyl-chloride. The technique is as follows: A mass of absorbent cotton is sprayed with the methyl-chloride, and then applied over the affected testicle for twenty or thirty seconds once or twice a day. A skilled person may use this treatment directly to the part. The point to be observed is not to touch the unaffected parts with the chemical. Care must be exercised in order that dermatitis be not produced. The scrotum may be enveloped in cotton after the applications. Ducastel and De le Valle<sup>2</sup> report that immediate relief and prompt resolution are produced, and that the duration of the treatment is seven days, and the sojourn of the patients in the hospital is eleven or twelve days. Practically the same method of treatment was tried for a short time at Charity Hospital in 1869. The refrigerating agent used was sulphuric ether applied continuously on lint, the scrotum being supported by oakum. The idea, I think, originated with Dr. Assadorian,<sup>3</sup> at that time one of the house-surgeons.

The latest novelty in the treatment of epididymo-orchitis is the method of Balzer,<sup>4</sup> who uses an ointment of guaiacol in the proportion of 3 or 5 parts to 30 parts of vaseline. A watery solution of like strength may also be employed, either by compress or by spray. This agent is said to exert a very sedative action on the parts by easing the pain and rendering the patient comfortable.

Strapping the testicle is never appropriate in the acute stage, though it may be beneficial in some cases of chronic swelled testicle. It is much less commonly employed now than formerly, owing to the fact that it is difficult of application, is not cleanly, loosens quickly, and often gives rise to fissures and inflammation of the skin. The scrotum must be smoothly shaved before the plaster is applied. Mercurial, belladonna, or the plain rubber adhesive plaster may be used in strips of three-quarters of an inch in width. A better method of pressure to the enlarged testis is that recommended by Corbett, the object of which is to envelop the organ after the manner that a football is covered with leather. For this purpose oval India-rubber bulbs of various sizes, such as are found in the spray apparatuses, may be used. The upper part is cut off and forms the neck, around the free margin of which may be sewn lead wire divided into two or three segments, by which means suppleness is retained and injurious pressure of the cord is prevented. The bulb is then cut lengthwise, and into the holes pierced on each side of the cut surfaces silk cord may be adjusted like laces in a corset. As the testis grows smaller, more and more of the bulb may be cut away, and thus the holes become placed farther back and further pressure is made. It is well to first envelop the testis in a layer of absorbent cotton, and, if indicated, ointments may be spread on it.

Another method is the following, recommended by Escalier, which is a modification of the suspensory of Langlebert: The testis is grasped, and

<sup>1</sup> "Traitement de l'Orchite par le Stypage au Chlorure de Méthyle," *Annales de Derm. et de Syph.*, 1890, pp. 429-430.

<sup>2</sup> "Étude comparée de la Refrigeration et de la Compression dans le Traitement des Orchites," *Thèse de Paris*, 1890.

<sup>3</sup> *Am. Journ. Derm. and Syph.*, vol. i., 1870, p. 216.

<sup>4</sup> *Thérapeutique des Maladies vénériennes*, Paris, 1894, pp. 69-70.

around its upper portion a ring of adhesive plaster is fixed, and covered over with a piece of silk handkerchief, over which is a thick layer of absorbent cotton, and over that again a layer of gutta-percha tissue. Then over the whole strips of adhesive plaster are passed in a circular manner, so that the ends may be drawn more or less tightly before being fixed. About every twenty-four hours it is necessary to tighten the adhesive strips. Removal of fluid from the tunica vaginalis is especially necessary in all cases before compression is applied.

In those extremely severe cases in which the testis is also inflamed, together with serous effusion in the tunica vaginalis, prompt puncture of this sac is urgently called for, and is commonly followed by marked relief of the pain and tension in the organ. It is well to employ a small straight bistoury, and to make a number of minute punctures well down into the cavity of the tunica vaginalis, over its median and most rounded portion, taking care that the tunica albuginea is not wounded. When practicable, in these cases withdrawal of the fluid by the hypodermic syringe may be done. The older surgeons, particularly French and English, advocated incisions fully six-tenths of an inch into the parenchyma of the testis. Such procedures were frequently followed by hernia of the testis-substance and atrophy of the organ, and should not be resorted to.

In cases of swelled testicle in which the engorgement is very great a number of leeches, according to the powers of resistance of the patient, may be applied to the groin as far down as the scrotum, but not on it. Relief is rarely afforded unless at least six to ten or twelve leeches are used.

The treatment of neuralgia of the testis following gonorrhœa, or indeed any morbid process, should be directed primarily to the affected part. Blisters with cantharidal collodion may produce much benefit. Paquelin's cautery and the various stimulating applications already detailed may be used. Opium and belladonna ointment may also be of service, according to the symptoms. If any thickening of the epididymis or cord can be made out, it should receive energetic treatment on the lines followed in treating induration of the epididymis. In every case the condition of the deep urethra should be ascertained, and if any inflammation be found, it should be treated. Any general morbid condition should be carefully considered, and proper medication and hygiene should be instituted. It is well to remember that, owing to fear, after recovery from gonorrhœa some patients remain bravely continent, and as a reward sometimes they have boring, aching, and dragging pains of varying severity in the cord and testes, which may be mistaken for neuralgia of the testes, and which may be relieved by physiological processes.

Induration of the epididymis and enlargement of the testis, which sometimes follow gonorrhœa or other morbid processes, require some of the foregoing methods of treatment. Stimulation and compression are especially indicated. Strapping the testes and the use of the other compressing agents should be employed. In some cases benefit follows the continuous use of iodine or iodide-of-lead ointment. In some cases of chronic induration of the testis and epididymis, not due to syphilis, mercurial ointment with compression will produce resolution. Then, again, I have seen great benefit follow the combined use of mercurial ointment and the mixed treatment, though the induration was wholly due to gonor-



rhœa, and not even remotely to syphilis. In obstinate cases it is always well to try this combination treatment.

The local treatment of the miscellaneous forms of orchitis due to infectious processes and to traumatism should be based on the lines already laid down. Such surgical relief as may be rendered necessary by abscess-formation should be applied on general principles.

The testicular inflammation due to malaria demands quinine, and the other infectious forms of epididymo-orchitis and epididymitis should be treated symptomatically on general principles. One golden rule should always guide the surgeon in the treatment of these testicular affections, and that is not to cease treatment until all the products of inflammation have been removed by absorption.

## CHAPTER XXIII.

### GONORRHOEAL OPHTHALMIA AND SERO-VASCULAR CONJUNCTIVITIS.

#### Gonorrhœal Ophthalmia.

GONORRHOEAL OPHTHALMIA is happily a rare accident rather than complication of gonorrhœa. According to statistics, it occurs 59 times in 37,034 cases of eye diseases, but probably in far greater frequency in the course of gonorrhœa. It is a violent and often destructive inflammation, and more intense than purulent conjunctivitis. It is developed in the eyes of young infants during delivery by gonorrhœal pus in its mother's vagina. The usual mode of infection is the transference of the pus from the genitals to the eyes by means of the fingers. In some cases the pus of the infected eye is carried to the other by the fingers during sleep or by accident during the day. Towels and linen are also said to be the vehicles of infection.

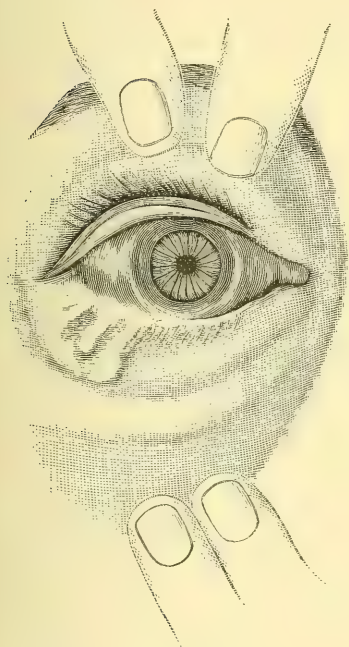
The virulent form of ophthalmia has been shown (see p. 86) to be caused by pus-containing gonococci. The less virulent form is said to be due to pus not containing gonococci, but other pyogenic microbes. In the majority of cases of the milder affection the symptom-complex is much less severe than in gonorrhœal ophthalmia, but in some cases the severity is seemingly just as great. All forms of chronic urethral and vaginal pus should be regarded as dangerous. The pus of balanitis and of abscesses, though said to be innocuous to the eyes, should never be carelessly brought in contact with them, such is the danger of infection from every form of purulent secretion.

This form of ophthalmia is said to be more common in men than in women, for the reason, probably, that gonorrhœa is so much more frequent in the former than in the latter. It may occur in the acute stage of gonorrhœa, but it is generally seen during the declining stage. It may be confined to one eye or may later on attack the other one.

**Symptoms.**—The first symptoms, which usually begin in a few hours or as late as thirty hours after contagion, are hyperæmia of the con-

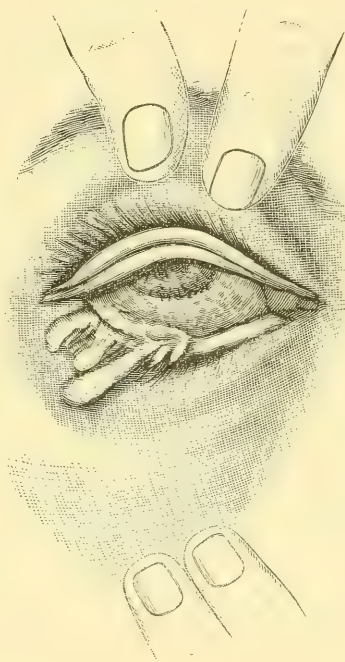
conjunctiva, an itching sensation at the margin of the lids, as if caused by a foreign body, soon followed by increased lachrymation, a gumming of the ciliae together, and collection of little masses of mucus at the inner canthus. The watery secretion soon becomes mucoid and very shortly purulent. A conjunctivitis, mild at first and limited to the lids, but later on of a severe type, involving the ocular mucous membrane, which is elevated above the sclerotic coat, is then seen. All of the conjunctival surface is then of a very deep-red color, much swollen, producing eversion of the lids, and roughened from distention of the papillæ. The intense chemosis of the conjunctiva bulbi is well shown in Figs. 86 and 87, in

FIG. 86.



Gonorrhoeal ophthalmia, showing well-marked chemosis.

FIG. 87.



Gonorrhoeal ophthalmia, showing commencing opacity of the cornea.

which the red, swollen, and infiltrated membrane surrounds the cornea like a pad. At this time the secretion is purulent and profuse, and much redness and œdema of the integument of the lids is present, as seen in Fig. 88. The following account of gonorrhoeal ophthalmia by my late colleague, Dr. Bumstead, who to his many attainments added that of an accomplished ophthalmologist, is inimitably graphic: "An attack of gonorrhoeal ophthalmia is so rapid in its progress that the early symptoms just now described may have passed away before the first visit of the surgeon, who is often called to see his patient only after the full development of the disease. He probably finds him sitting up, his head bent forward, his chin resting on his breast, and his handkerchief applied to his cheek to absorb the discharge, which irritates the surface upon which it flows. The eye-

lids are swollen, especially the upper, which slightly overlaps the lower, and is of a reddish or even dusky hue. The patient states that he is unable to open the eye. His inability to do so is caused less by an intolerance of light than by the mechanical obstruction which the swelling of the lids occasions, and by the pain which is excited by any friction of the inflamed surfaces upon each other.

“The surgeon now moistens the edges of the lids with a rag dipped in warm water in order to facilitate their separation, and proceeds with his examination. In his attempt to open the eye he is careful not to make pressure upon the globe, in order to avoid giving unnecessary pain, and also lest the cornea, if already ulcerated, may be ruptured and the contents of the globe escape. With one finger just below the eye he slides the integument downward over the malar bone, and thus everts the lower lid, the upper lid being elevated by a similar manœuvre with the other finger of the same hand applied below the edge of the orbit; or, again, he may expose the globe by seizing the lashes and margin of the upper lid with the thumb and finger, and drawing the lid

FIG. 88.



Gonorrhœal ophthalmia, with great oedema of of the tegumentary parts.

forward and upward. All this may be accomplished with the left hand, the right being free to wipe away the discharge or to make application to the eye.

“As soon as the lids are separated a quantity of thick yellowish pus wells up between them and partially obstructs the view: the swollen palpebral conjunctiva, compressed by the spasmodic action of the orbicularis muscle, may also project in folds. The collection of matter is now removed with a soft moist sponge or rag, and the surface of the ocular conjunctiva exposed. This membrane is found to be of a uniform red color, with the vessels undistinguishable from each other, and elevated above the sclerotica by an effusion of serum and fibrin in the cellular tissue beneath it. This swelling of the conjunctiva is seen to terminate at the margin of a central depression occupying the position of the cornea and filled with a collection of the less fluid constituents of the puriform discharge, which may at first be mistaken for the débris of a disorganized cornea. On removing this matter, however, the latter structure may still be found clear and transparent at the bottom of the depression, where it is overlapped by the swollen conjunctiva. In less fortunate cases it may have become hazy from infiltration of pus between its layers, or ulceration may have commenced. If an ulcer is not evident on first inspection, it may be discovered at the margin of the cornea by gently pushing to one side the overlapping fold of the conjunctiva. Meanwhile, the secretion of pus is constantly going on, and it requires repeated removal. It is astonishing to observe how large a quantity of this fluid can be secreted



by so limited a surface. It has been estimated at more than three ounces per day in some cases."

The amount of pain occasioned by this disease varies in different cases. During the development and acme of the inflammation it is generally severe. It is described by the patient as a sensation of burning heat and tension in the eyeball, radiating to the brow and the temple. The system at large sympathizes with the local disease. For a time there may be general febrile excitement, but symptoms of depression soon appear; the pulse becomes rapid and irritable, the skin cold and clammy, and the patient anxious and nervous. This depression of the vital powers is not invariably met with, but is the most frequent condition of the patient after the disease has continued for a few days; and it may appear even at an earlier period when the health has been previously impaired from any cause. Notwithstanding the severity of the symptoms, resolution is still possible. Under proper care and treatment the inflammatory action may abate and the tissues recover their normal condition, leaving the eye as sound as before the attack. So fortunate a result is more to be hoped for than confidently anticipated.

**Prognosis.**—The prognosis is always grave, especially so when both eyes are attacked. If treatment is instituted at an early period, the chances of the patient are best. If ulceration of the cornea has taken place, they are bad. It generally begins at the corneal margin, either superficially or deeply, and may creep around or may advance toward the centre. Sometimes the whole cornea is extruded and the contents of the eye escape. An eye has been known to be thus destroyed within twenty-four hours, and even in a single night. The escape of the contents of the globe often gives the patient hope that he is recovering, whereas his sight is gone.

According to the extent and situation of the ulceration the eye is more or less permanently injured. When superficial and marginal, the resulting opacity of the cornea may not interfere with the sight, which may be impaired if the leucoma is central. Perforation of the anterior chamber and prolapse of the iris, when partial, may also be remedied by art; but when the whole or the larger part of the cornea has sloughed away, and the prolapsed iris has become covered with a dense layer of fibrin, forming an extensive staphyloma, the case is hopeless.

Trachoma or exuberant granulations of the palpebral and bulbar conjunctiva often follow gonorrhœal ophthalmia, and are sometimes of much annoyance to the patient and resistant to treatment. Frequently a tendency to hyperæmia of the external ocular tissues from slight irritation is observed over long periods.

**Diagnosis.**—So much do severe cases of purulent ophthalmia resemble those of the gonorrhœal form that a sharp diagnosis is often impossible, owing to the meagreness of the history. Any intense form of ophthalmia, whatever may be its origin, must be looked upon in as serious a light as that due to gonorrhœa. In all cases the pus should be examined microscopically at once, and if the gonococcus is found it is absolutely certain that the case is of gonorrhœal origin, and therefore a very grave one. In general, when less virulent micro-organisms are found, the diagnosis is not bad. The earlier a case of gonorrhœal ophthalmia is seen and that a proper treatment is commenced, the better is the prognosis. In infants

the prognosis largely depends on the care which the case receives. In early adult life there is such resistance of the tissues that with care the inflammation may be controlled. Toward middle age and in elderly subjects the tissue-resistance is not as great, and the prognosis then is more serious.

**Treatment.**—The first indication in treatment is to procure a skilled, kind, and trusty female nurse—and preferably two, one for the day, the other for the night—who should be in constant attendance. She should, at the outset, be thoroughly impressed with the gravity of the case, instructed as to her duties, and shown the technique of opening the eye and removing the pus. She must be warned of the intense contagiousness of the secretions, must be directed to keep her hands and nails in a thoroughly aseptic condition, and she should provide herself with a pair of protective concave spectacles having a diameter of two inches. In case one eye only of the patient is affected, the other may be covered by Buller's shield. This consists of two pieces of India-rubber adhesive plaster, one four and the other four and a half inches square, between which, in a hole in the centre, a deep watch-glass is fastened. The watch-glass is placed over the eye, which can then be inspected, while the margins are fastened to the nose, forehead, and cheek. It is well to leave a little space for ventilation on the lower outer angle. Or the sound eye may be covered with cotton wool strapped down with adhesive plaster, over which a solution of gutta-percha is painted. In young subjects it is well to secure the hands.

If seen before inflammation has fully developed, four to six leeches may be applied at the external canthus or to the mucous membrane of the corresponding nostril, or if not at hand cups may be used on the temples. The character of the inflammation being manifest, a careful, continuous, and energetic treatment must be followed. Constant application of cold is then absolutely required. This is accomplished by means of small pieces of linen of *a single thickness*, which, when thoroughly chilled upon a piece of ice, should be laid over the eye, and replaced by another every two or three minutes in very intense cases. These pieces of linen should be burned immediately after use. The further treatment of the case should be as follows, after the manner proposed by my friend, Dr. J. A. Andrews, which has been productive of excellent results at Charity Hospital: When the inflammation is fully established the indications are to wash away the pus in the most perfect manner as soon as possible, and to render the conjunctival surface as nearly as possible aseptic. For this purpose a saturated solution of boracic acid is necessary. A bichloride solution, 1:10,000 or 20,000, may also be used. This may be used by means of Andrews' irrigator No. 2, made by Ford of New York, or by means of a piece of fine rubber tubing attached to a fountain syringe, and allowed to flow with the utmost gentleness. These irrigations must be repeated as often as necessary. Then, from the beginning of the disease, a 2 per cent. solution of nitrate of silver should be dropped, rather than brushed, into the eye, since it is then distributed by the movement of the eyelids. The more vascular and swollen the conjunctiva, the more frequent should be these instillations, which may be made from three to four times daily, according to indications. Instillations of a four-grains-to-the-ounce-of-water solution of atropine may be used also at intervals during the severity of the attack. As

improvement takes place, the use of the solution of nitrate of silver should be more infrequent until it is finally dropped.

If chemosis has taken place, the ocular conjunctiva and subjacent connective tissue should be divided by means of blunt scissors, and in case the eversion of the lids is not complete, the outer commissure should be freely divided, together with the canthal ligament, for the inflamed surfaces must be in such a condition that they can be thoroughly treated. Excessive œdema of the lids interfering with the opening of the eye may be relieved by minute punctures of the skin. After the subsidence of the acute symptoms the nitrate-of-silver solution, which toward the end has been used much less frequently than at first, may be replaced by a solution of sulphate of zinc, as follows :

Ry. Zinci sulphatis,	gr. ij ;
Glycerinæ,	ʒij ;
Vin. opii,	ʒj ;
Aquæ,	ʒv.—M.

This may be instilled into the eye by means of a glass-and-rubber dropping-tube.

Should ulcer of the cornea occur, the pupil should at once be dilated with atropine solution and vigorous but prudent measures adopted.

The granular condition of the conjunctiva should be treated by the application of a piece of sulphate of copper to the surface every second or third day.

Patients suffering from gonorrhœal ophthalmia should occupy a large, well-ventilated room, which should be moderately, not wholly, darkened, and they should be placed exclusively in the care of the surgeon and the nurse or nurses. At the onset of the disease a brisk aperient, even a cathartic, may be given, which should be repeated as necessary, care being taken that the patient's strength is not impaired by it. A mild diet, gruels and light broths, may be taken. Should evidences of malnutrition and debility appear, with weak and irritable pulse, more nutritious food of the most digestible character must be given, together with tonics, and perhaps ale, porter, milk punch, etc. It must be remembered that the vitality of the corneal tissue is very low, and that its destruction may be hastened by an impoverished state of the system.

Convalescence is much hastened by change of air, particularly in the mountains. It is sometimes astonishing to observe how rapidly the nutrition of the patient increases, and how quickly the trachoma and conjunctival congestion disappear, under the influence of country air.

### Sero-vascular Conjunctivitis.

This is a rare form of purulent conjunctivitis of which little has been written. This form of ophthalmia is really a complication of gonorrhœa, and not one of its accidents. Though the pathogenesis of this affection has not been studied, much less made out, I think, reasoning by analogy, that it will later on be settled that it is an infectious process due to septic absorption, like gonorrhœal rheumatism, etc. It certainly is not due to pus-contamination.



This form of conjunctivitis is called by Fournier "blennorrhagic sero-vascular conjunctivitis." Fragne,<sup>1</sup> an élève of Fournier, employs the title "blennorrhagic sero-vascular conjunctivitis without inoculation" as being more expressive.

This affection begins in a painless and insidious manner, but its objective symptoms are well marked. The patient at first feels a slight heat in the eye and a sensation as if some particle had lodged on it. Then the conjunctiva bulbi becomes rather swollen and hyperæmic. This is followed by hyperæmia of the conjunctiva of the lids. The secretion is at first serous and moderately copious, but in a few days it becomes slightly purulent. In the acme of the inflammation we find the whole conjunctiva rather swollen, with perhaps some œdema of the eyelids. The mucous membrane is of a quite deep-red color and of velvety appearance. The œdema is not usually very extensive. The affection runs an indolent course, and usually does not cause much pain or annoyance. One or both eyes may be affected. After cure a relapse is not uncommon. I have seen several cases in which patients were thus affected with each attack of gonorrhœa.

The **prognosis** is almost invariably good.

**Treatment.**—The eye should be irrigated with saturated boracic-acid water, and a few drops of a 2 per cent. solution of nitrate of silver may be dropped in the eye once or twice a day. Ice-cloths may be necessary.

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## CHAPTER XXIV.

### GONORRHŒAL RHEUMATISM.

THE term "gonorrhœal rheumatism" is applied to a complex inflammation, chiefly of the joints, fasciæ, bursæ, and tendinous sheaths, and also of the eye and fibrous tissues, which follows in the course of urethral gonorrhœa and gonorrhœal vulvitis, vaginitis, and conjunctivitis. It sometimes complicates urethral suppuration caused by instrumentation, even as simple as the passage of a sound. This form of rheumatism does not complicate balanitis or simple inflammations of the external genitals of the male or female.

Gonorrhœal rheumatism attacks men more frequently than women, and is seen in infants and in the young and the old. It has no etiological relation to a pre-existent rheumatic condition or diathesis, for the reason that we see many truly rheumatic subjects who may suffer from gonorrhœa without becoming affected with its rheumatism. This affection may follow each attack of gonorrhœa, but such a course is far from being the invariable rule, since many men have thus suffered once after gonorrhœa, and never again after subsequent infections.

Gonorrhœal rheumatism is a rare affection if compared with the fre-

<sup>1</sup> *Thèse de Paris*, 1888.

quency of gonorrhœa, and occurs in about 10 per cent. of all cases of that disease.

It would be an utter waste of time to detail the old views and discuss the various contentions as to the origin and nature of gonorrhœal rheumatism. To-day, in the light of our knowledge of the pathological action of the gonococcus, the subject is quite clear. It is therefore worth while to present the experience which led up to this condition of enlightenment. As early as 1883 it was claimed by Petrone<sup>1</sup> that he had found the gonococcus in the fluid of gonorrhœal arthritis. This statement was further strengthened by the observations of Kammerer,<sup>2</sup> Herteloup,<sup>3</sup> Bergmann,<sup>4</sup> Hartley,<sup>5</sup> and many others, who claimed that they also found the gonococcus in the joint effusions of gonorrhœal rheumatism. Owing to the fact that these various observers had only used the microscope in their studies, there was a doubt in the minds of many whether they had really discovered the gonococcus or some other diplococcus resembling it. As a result of various studies, the following hypotheses as to the origin and nature of gonorrhœal rheumatism were entertained: First, that it was the direct result of gonococcus invasion of the joints and various fibrous tissues; second, that it was the result of a mixed infection, in which the gonococcus and pyogenic microbes were the morbid agents; third, that the process began by the invasion of the gonococcus, which prepared the way for pyogenic microbes; and, fourth, that it was a phlegmasia produced by toxins carried from the urethra by means of the circulation to the parts affected. These observations have since been confirmed by several observers.

Deutschmann<sup>6</sup> found gonococcus in the interior of the pus-cells of two cases of the joint effusion of gonorrhœal rheumatism, and later on Hock<sup>7</sup> was able to obtain pure cultures from a similar fluid.

The latest and most important contribution to the subject is made by Finger,<sup>8</sup> Ghon, and Schalgenhauer. Finger found in the case of an infant suffering from purulent ophthalmia the gonococcus alone in perichondritis of the ribs, and the gonococcus and streptococcus in the inflamed knee-joint, also affected with periarticular suppuration. In the temporo-maxillary articulation the streptococcus alone was found. This observation of Finger, made with so much care and detail with the aid of the microscope and culture-tests, supported by many observations and facts presented by others, is all-important in settling the doubt as to the causative relation of the gonococcus to gonorrhœal rheumatism.

<sup>1</sup> *Rapport Clin. di Bologna*, 1883, 3d series, vol. iii, pp. 94 et seq., and *Conspect. für Chirurgie*, 1888, No. 87, p. 386.

<sup>2</sup> *Conspectus für Chirurgie*, 1884, No. 11, pp. 49 et seq.

<sup>3</sup> *Gazette des Hôpitaux*, 1885, p. 1004.

<sup>4</sup> *St. Pierreburg med. Zeitsch.*, 1885, No. 35.

<sup>5</sup> *New York Med. Journal*, April 2, 1887.

Gayon and Janet have reported four cases of gonorrhœal rheumatism in the joint effusions of which they were unable to find the gonococcus or any other microbe. Too much stress need not be laid on these negative observations, for the reasons—first, that the particular specimens of fluid withdrawn might not have contained the microbes which were present elsewhere; and second, that the micro-organism itself might have been killed by the inflammatory products which it had caused. *Annuaire des Méd. des Hôp. Gen.-civ.*, 1889, pp. 462 et seq.

<sup>6</sup> *Geogr. Archiv.*, vol. xxxvi., 1890, pp. 140 et seq.

<sup>7</sup> *Wiener klin. Wochenschrift*, 1892, No. 41, p. 74.

<sup>8</sup> *Archiv für Derm. und Syphilis*, 1894 vol. xxviii., Heft 1, pp. 2 et seq., and Heft 2, pp. 277 et seq.

Hewes<sup>1</sup> has recently claimed that he found and cultivated the gonococcus taken from the joint fluid and blood of two cases of patients suffering from gonorrhœal rheumatism.

Dr. W. H. Welch<sup>2</sup> has reported the case of a woman suffering from gonorrhœa complicated by pyæmia and endocarditis, from whom during life he extracted some blood. This was mixed with agar, and as a result cultures were obtained which showed the gonococcus. This observation, coming from so eminent an observer, certainly carries conviction with it, and clearly demonstrates that the gonococcus is carried into the blood-current, which may deposit it throughout the body. Welch also found the gonococcus in the purulent secretion of gonorrhœal inflammation of a tendinous sheath.

In the light of our present knowledge, therefore, we are warranted in stating that the essential inflammation in gonorrhœal rheumatism is caused by the gonococcus and its toxins, and that the morbid process may be further complicated and aggravated by the concurrent or subsequent action of pyogenic microbes. Whether the cases presenting ordinary serous effusion are due to the gonococcus alone or its toxic products, and whether the cases of articular and fibrous-tissue abscesses are due to the action of the gonococcus, aided by that of pus-microbes, we cannot to-day state with scientific precision. The results of observation seem, however, to show that when the joint effusion is serous or sero-fibrinous the gonococcus is found in it, and that when it is sero-purulent or purulent pyogenic microbes are found. There seems to be sufficient evidence at hand to warrant the statement that in many cases the pyogenic microbes dominate in the phlegmasia, and thus the gonococci perish in whole or in part.

It is very difficult to state definitely the date of the onset of gonorrhœal rheumatism. While the complication may and does occur in acute urethritis in a goodly number of cases, as I have myself seen, its onset then is in the second or third week at the earliest. Cases have been reported in which this form of rheumatism is said to have begun on the sixth day of acute gonorrhœa, but is very probable that there was an error in the observations. Though we have not absolute knowledge on the subject, it is probable that absorption of septic material does not take place until the infection has reached the posterior urethra. It is usually in the older and more chronic cases of gonorrhœa that its rheumatism appears; consequently we more frequently see it develop in one, two, three, and four months after the beginning of the infection, and even later.

From old and recent medical literature Finger<sup>3</sup> has tabulated 375 cases in which the site of the disease is stated. They are as follows: Gonorrhœal rheumatism occurred<sup>4</sup>

<sup>1</sup> *Boston Med. and Surg. Journal*, No. 22, 1894.

<sup>2</sup> *Med. Record*, June 15, 1895, p. 756.

<sup>3</sup> *Op. cit.*, pp. 296 et seq.

<sup>4</sup> Bornemann's statistics (*Studier over den Gonorrhøiske Rheumatismus*, Copenhagen, 1887) are also interesting. They are based on the study of 278 cases. In these cases the knee was affected 240 times; the foot, 151; the shoulder, 68; the metacarpo-phalangeal joints, 51; the hip, 46; the elbow, 45; and the jaw, 12. It was noted that there was not uniformly an excess of synovial fluid, since in the 240 cases in which the knee was attacked it was only found 183 times. Affections of the tendons and bursæ occurred in 41 patients; 4 suffered from periostitis; and in 3 the muscles were attacked. Out of the whole number of cases (278), endocarditis occurred in 2 cases and sciatica in 5.



In the knee-joint . . . . .	136 times.	In the metatarsus . . . . .	7 times.
“ tibio-tarsal joint . . . . .	59 “	“ sacro-iliac synchondrosis . . . . .	4 “
“ wrist-joint . . . . .	43 “	“ sterno-clavicular joint . . . . .	4 “
“ finger-joint . . . . .	35 “	“ chondro-costal joint . . . . .	2 “
“ elbow-joint . . . . .	25 “	“ intervertebral joint . . . . .	2 “
“ shoulder-joint . . . . .	24 “	“ peroneo-tibial joint . . . . .	1 time.
“ hip-joint . . . . .	18 “	“ crico-arytenoid joint . . . . .	1 “
“ maxillary joint . . . . .	14 “		
			375 times.

In about 60 per cent. of cases several joints are involved, and then the affection is termed polyarticular, and in 40 per cent. only one joint is involved, the affection then being called monoarticular.

Besides the joints other structures are frequently involved in gonorrhœal rheumatism, either in combination with the joint lesions or as special inflammations. The bursæ are quite frequently attacked. The bursa in front of the tendo Achillis and the one beneath the os calcis are most frequently involved, while those of the wrist, ankle, the patella, the tuber ischii, the bicipital, and of the psoas muscle are less commonly attacked. The tendinous sheaths may be affected in gonorrhœal rheumatism, either alone or in combination with joint lesions. The sheaths most commonly the seat of the inflammation are the extensors of the hands and fingers, the dorsal flexors of the toes and the flexor pollicis, the sheaths of the biceps brachii, and of the tendo Achillis. The external fibrous structures and ligamentous tissues of joints, particularly the large ones of the knee and the elbow, are not unfrequently involved by this form of rheumatism, which is called periarticular gonorrhœal rheumatism. This may also be said of smaller joints, such as of the hands, feet, and toes. In these cases there is no intra-articular phlegmasia. The plantar and palmar fascia are quite rarely the seat of gonorrhœal inflammation.

The essential lesion of the joints is an inflammation of their synovial membrane, which may result in serous synovitis, sero-fibrinous synovitis, sero-purulent synovitis, which are the more common forms, and purulent synovitis, which is quite rare. Gonorrhœal rheumatism is essentially an hydrarthrosis, and in very many instances the disease is confined to the synovial membrane of the joint during the whole course of the affection.

In some cases the discharge ceases when the rheumatism begins, in others it is increased before its onset, and in still other cases there is no alteration in its course.

Acute inflammation of one joint, particularly of the knee, and called gonitis, is the most common form of gonorrhœal rheumatism. This form is called acute monoarticular gonorrhœal rheumatism. In this affection there may be no premonitory symptoms whatever, and the patient's first complaint will be that his joint is rather painful and that he limps slightly. In other cases there is a slight chill and fugitive pains over the body, with malaise and mild fever. These symptoms usher in the hydrarthrosis. In more severe cases these symptoms are much accentuated. I have seen cases in which there was mild delirium, with a condition resembling typhoid fever in its third week. Again, I have seen cases—but rarely, however—in which the patient was stupid, dull, heavy, and very feverish (temp. 102° to 105° Fahr.), and presented the appearance of profound septic intoxication. The symptoms may, therefore, be very mild, quite severe, and exceptionally very severe and even grave in character. The acme of the constitutional symptoms is generally reached within a week,

and from that time onward they range in about the same degree of mildness or severity. Sweating, so common and so copious in ordinary rheumatism, is not observed to any marked extent in the form under consideration.

In general terms, it may be stated that the symptoms are rather mild in cases of serous effusion, rather more severe when the effusion is sero-fibrinous, and most severe when it is sero-purulent or purulent.

The pain in the joint is at first slight, but it speedily increases in intensity, particularly if the patient continues to go about. The evidences of serous effusion into the joint are soon seen. If the knee-joint is affected, the patella is soon elevated above the level of the femur, and two fluctuating cushions may be seen on each side of its upper portion and over the lower extremity of the femur, and two similar ones on each side of its lower portion over the head of the tibia. The patella floats in the fluctuating cushion, and if pressed downward it rebounds with a distinct click. With the onset of the effusion heat, redness, and swelling are observed in the investing integument. In many acute cases there is no perceptible thickening in the fibrous structures around the joint. In the chronic form this extra-articular condition may be observed. In the acme of the affection the joint is much enlarged and distended, the skin is red and tense, and there is pain which may be dull and continuous or throbbing and stabbing. In many cases the pain is worse at night. As the phlegmasia in the joint increases the limb becomes more and more immobile.

This monoarticular form of gonorrhœal rheumatism may constitute the whole affection, but in some cases other joints become involved. When the disease thus spreads, there is no abatement of the morbid process in the joint first affected, but there may be an intensification of the general symptoms. Under favorable circumstances the acute dropsy of the joint, in the monoarticular form, subsides in from four to six weeks, but if the morbid process is more severe and the exudates are sero-fibrinous, sero-purulent, or purulent, then the duration is much longer—we may say indefinite.

Monoarticular gonorrhœal rheumatism, also called gonocœle, may begin in a slow and subacute manner, and may then develop into a chronic affection. In this event the patient experiences very little pain, and only some inconvenience in walking and moving the joint. Sooner or later he discovers that the joint is enlarged and the seat of serous effusion. There is no extra-articular inflammation and no general systemic reaction. In this condition the joint may remain for many months. In some cases visible improvement may be noted, which is usually followed by an exacerbation of a low grade. In this way the case may hitch and halt until inflammatory changes in the synovial membrane and articular surface, and even the bones, are developed and arthritis deformans results.

The less common form of gonorrhœal rheumatism is that in which, as a general rule, two or three, and exceptionally many, joints are involved, and it is called polyarticular acute gonorrhœal rheumatism. The symptom-complex of this form resembles that of the monoarticular form. The course of this joint affection, however, is different. Sometimes during the course of the inflammation in the first joint a second one is attacked, but

there is usually no marked amelioration in the condition of the first. With each joint involvement the symptoms may undergo an exacerbation, which is soon followed by a remission; and thus the case progresses until several or many joints are involved. Usually the number of joints involved is not as great as in articular rheumatism. I have, however, seen a case in which every joint of the body, even the temporo-maxillary articulation, was thus involved, and as a result became ankylosed.

In this form also there is usually not the painful thickening of the fibrous tissues around the joint which is such a marked feature of articular rheumatism. The disproportion between the general symptoms and the joint lesions is so marked in gonorrhœal rheumatism, and in such contrast with what occurs in acute articular rheumatism, in which the symptoms are severe and striking, that the nature of the complaint is readily determined.

The **course** of this form of rheumatism depends largely on the nature of the effusion and of the exudates. If the lesion is simply a serous effusion, the affection may last two, three, or many months. If it is sero-fibrinous, it may last longer; and if sero-purulent or purulent, the course may be indefinite.

Chronic dropsy of the joint, more or less disorganization, and even ankylosis, may result. In very chronic cases atrophy of the muscles connected with the diseased joints may occur.

As **complications** of the polyarticular form of gonorrhœal rheumatism we sometimes see sclerotitis, iritis, aquo-capsulitis, bursitis, and inflammation of tendinous sheaths.

There are certain minor forms of gonorrhœal rheumatism which may or may not present conspicuous objective and subjective symptoms. These are inflammations of tendinous sheaths, of bursæ, of fasciæ, and of the extra-articular structures. The tendinous sheaths may be affected alone or synchronously with the joints. Those most commonly attacked, are, as before stated, the extensors of the hands and fingers, the dorsal flexors of the toes and the flexor pollicis, the sheaths of the biceps brachii, and the tendo Achillis. The visible signs of this affection are redness and swelling along the course of the tendon. This elongated phlegmasia is more or less painful, and causes more or less functional impairment of the part affected. So commonly is this condition due to gonorrhœa, and so strikingly in contrast with the phlegmasic non-painful tendinitis due to syphilis, that its nature will be readily perceived. Tuberculous inflammation of these structures may be attended with an acuteness of symptoms, objective and subjective, which may suggest gonorrhœa as their origin. This point should always be borne in mind.

Inflammation of bursæ due to gonorrhœa shows itself, at first, as a localized red and rather painful swelling of the part. If the affection becomes chronic, the redness in a measure disappears and the part becomes less painful. The bursæ of the tendo Achillis, of the os calcis, wrist, ankle, patella, and tuberosity of the ischium, are the ones most commonly attacked. This affection may be acute, subacute, and chronic in course.

It is not uncommon to find concomitant inflammation of tendinous sheaths and of bursæ in the course of polyarticular acute gonorrhœal rheumatism.

Inflammation of the investing structures of joints, and sometimes of



the ends of large and expansive tendons, is a rather infrequent form of gonorrhœal rheumatism, and is termed arthralgia. This condition may exist alone or in conjunction with a more extended development of the disease. It may attack the outer surface of one or more large joints in whole or in part. There may or may not be redness and swelling, but there commonly is pain of an acute, aching, persistent character. The area of pain may be limited to an inch or more of tissue, and it may be extensive. There is usually an absence of general symptoms. This affection may last several weeks, and even months, but it generally yields to vigorous counter-irritation.

I have many times observed in cases of chronic posterior urethritis, particularly during or near an exacerbation, patients complain of rheumatic pains in the large and small joints, in the fasciæ, and in diffuse form in the muscles. Sometimes these attacks of pain are not severe, and cease in a short time; in other cases the pain is severe and persistent. In all the cases there is little if any systemic reaction. I am led to suspect that many cases of mild and anomalous rheumatism are in reality caused by urethral suppuration.

The fasciæ involved in gonorrhœal rheumatism are the palmar and the plantar, but cases thus affected are very rare: I have seen one or two of each. During the course of polyarticular gonorrhœal rheumatism the fibrous sheaths of muscles and their fasciæ are sometimes attacked. In old and broken-down subjects, the victims of very chronic and sometimes never-ending gonorrhœal rheumatism, after one, several, or many of their joints have become ankylosed, the disease goes on and on, attacking the fibrous structures of muscles and bringing about their atrophy. In such cases also we may find persistent arthritis of the bones of the hands and feet, which results in permanent disfigurement and sometimes great deformity.

In some cases of chronic gonorrhœal rheumatism sciatica, mild or severe, may occur, as pointed out by Fournier,<sup>1</sup> and in these cases periostitis may sometimes be observed.

Martel<sup>2</sup> describes as a rare complication of gonorrhœal rheumatism a phlebitis of the saphenous, femoral, and iliac veins, which may undergo resolution or lead to their obliteration.

The eye and heart complications of gonorrhœal rheumatism are described elsewhere.

**Diagnosis.**—In many cases the existence of a gonorrhœa or the history of a comparatively recent attack will suggest the nature of the case under observation. In the main, the absence of sweating and the comparatively mild systemic reaction (in the majority of cases) will suggest gonorrhœa as the cause of the rheumatism. Then the predilection of the disease to attack the larger joints, particularly of the knee, ankle, wrist, and shoulder, and to only invade one, two, or three joints, is indicative of gonorrhœa as its cause. Hydrarthrosis is common in gonorrhœal rheumatism, and is infrequent and slight in the ordinary form of the disease. The absence of a history of rheumatism is also significant of urethral suppura-

<sup>1</sup> "De la Sciatique blennorrhagique," *Bull. et Mémoires de la Société méd. des Hôp. de Paris*, 1869, vol. v. pp. 34 et seq.

<sup>2</sup> "De la Phlébite dans le Cours du Rhumatisme blennorrhagique," *Thèse de Paris*, 1887.

tion as a cause. The coincident involvement of tendinous sheaths, fasciæ, and bursæ, with perhaps the iris and conjunctiva, is a strong point against the case being one of ordinary inflammatory rheumatism.

In any case of doubt careful examination of the urine should be made, and if threads largely composed of pus-cells are found, the investigation should be pushed in the direction of gonorrhœal rheumatism. In all cases of obscure localized chronic rheumatism of the extra-articular structures, fasciæ, tendinous sheaths, and bursæ, a suspicion of urethral suppuration should be entertained and followed up.

**Prognosis.**—In all cases of involvement of the larger joints by inflammatory effusion the patient is a lucky man if he is well on his feet in six weeks or two months. When several joints are involved the illness will be still further protracted, and when the morbid process gives rise to sero-fibrinous or sero-purulent effusion the course of the case may be protracted for several or many months. In the more localized forms of gonorrhœal rheumatism without much systemic reaction, involving the extra-articular structures, the tendinous sheaths, fasciæ, and bursæ, one, two, or three, and even more, months may elapse before the patient is well and free from pain. In many cases the cure is largely dependent on the efficiency and vigor of the treatment adopted.

**Treatment.**—The golden rule in the treatment of all cases of gonorrhœal rheumatism is to cure the inflammation in the urethra, since that is the source and origin of the disease. If the suppuration is subacute or chronic, it must be treated accordingly, conforming to the directions already given. Antiblennorrhagics have no perceptible effect in these cases. In general, very mild nitrate-of-silver irrigations, thrown into the posterior urethra, are suitable for subacute cases of urethral inflammation, and more concentrated solutions by instillation in chronic cases. It is wonderful to see the marked effect amelioration of the urethral inflammation has upon the course of its resulting rheumatism.

When joints are involved, the patient must at once be placed on his back and the part put at rest. When there is much heat, redness, and swelling of the joint, cooling applications, such as ice-bags, solution of muriate of ammonia, and lead-and-opium wash, may be used. In plethoric subjects temporary ease may be obtained by the use of leeches. In some cases a flaxseed poultice in which laudanum has been mixed gives comfort. In every case the patient should receive (unless contraindicated) enough opium or morphine to make him comfortable. This agent rarely fails to give relief, but we may use antipyrine or phenacetin. Salol, salicylate of sodium, muriate of ammonia, nitrate of potash, oil of wintergreen, colchicum, iodide of potassium, and quinine may be used in appropriate doses. If these agents have any therapeutic effect on this boxed-up infective process in the joint, it is well; but, to say the least, they often do exert a moral effect upon the patient, who feels that he is taking medicine, and therefore doing all he can do in that direction.

With the decline of the acuteness of the joint inflammation much valuable aid can be given to the case by very active blistering of the joint. This may be done by the application of cantharidal collodion or a fly blister spread on sheep-skin. The fully-developed blister must be kept "open" by means of savin or tartar-emetic ointment. If healing of the skin takes place, the blister must be applied again in the same vigorous

manner. A little opium is a great help in keeping the patient's courage up while he is undergoing this persistent blistering process. When blisters fail to cause the hydrarthrosis to subside, it may be necessary to draw off the contained fluid and to irrigate the joint with sublimate solution, 2:5000, or carbolic acid and water, 1:50. Reaccumulation of the fluid demands a repetition of the process.

In all of the phlegmasiæ produced by gonorrhœal rheumatism the general scheme of treatment just outlined should be followed. Over limited patches and areas of a subacute or chronic nature strong tincture of iodine or pure ichthyol may be applied. In chronic cases, particularly those in which the joint-cavity is not involved, I have seen good results follow the liberal internal use of iodide of potassium. Indeed, in several cases in which there was absolutely no history of syphilis I have seen marked benefit follow the use of the mixed treatment in combination with strong mercurial inunctions and of mercurial fumigations. In two cases of gonorrhœal rheumatism of the bursæ in front of the tendo Achillis I produced a prompt cure by the injection of fifteen drops of a 5 per cent. watery solution of carbolic acid. This treatment may be used in all limited bursal and fascial inflammations due to gonorrhœa.

Paquelin's cautery, applied to limited spots, sometimes tends to promote resolution. In chronic cases mild (never severe) massage is sometimes surprisingly beneficial. In all chronic cases, where practicable, pressure to the extent of tolerance should be applied to the parts by means of elastic bandages, India-rubber adhesive plaster, or plaster-of-Paris splints. When suppuration and destruction or ankylosis of joints occurs, the cases are to be treated on general surgical principles.

Since in many cases of chronic gonorrhœal rheumatism there is a synchronous general cachexia, tonics should be given, change of air ordered, and general restorative means adopted.

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## CHAPTER XXV.

### PERITONITIS IN THE MALE DUE TO GONORRHŒA.

INFLAMMATION of the peritoneum of greater or less severity may result from the extension of the gonorrhœal process from some part of the seminal apparatus to that portion of the membrane in close contiguity with it.

Gonorrhœal peritonitis may be developed by acute inflammation of the seminal vesicles. The infectious process then begins in the rectovesical cul-de-sac, where it may localize itself, or it may spread indefinitely from that morbid centre.

Gonorrhœal inflammation of the vas deferens or of a limited segment thereof may be the cause of peritonitis, owing to the fact that these anatomical structures are for a considerable distance in direct contact with each other.



Zeissl<sup>1</sup> claims that inflammations of the lumbar ganglia (which are situated immediately behind the peritoneum), due to the extension of the gonorrhœal process, may also be the cause of peritonitis from contiguity.

We have already seen that during the course of gonorrhœa a limited portion of the vas deferens might become swollen and painful and cause fear of peritoneal involvement. In these cases, however, the deep pelvic or iliac pain usually ceases when the epididymis becomes swollen, as it usually does. In the majority of reported cases epididymitis and peritonitis had existed at the same time. Consequently, the testicular inflammation may often be an important diagnostic guide.

Patients attacked by gonorrhœal peritonitis commonly complain of colic at first, and soon direct attention to the tenderness in one of the iliac fossæ or of the groin. With the extension of the process the whole hypogastrium may become swollen and tender, and from that the whole abdominal cavity may be attacked. The symptoms are rapid and small pulse, increased respiration, and high fever. The pain is intense, particularly on pressure, and causes the patient to have a sallow, drawn, and anxious facies. There may be obstinate constipation, and exceptionally diarrhœa. In many cases vomiting, particularly of bile, has been observed. There is usually much distention of the abdomen. In this way the disease may run on and end in recovery, but a survey of the literature shows that in many instances death has ensued.

In many cases rectal exploration reveals marked, even intense, tenderness or pain in the prostate and seminal vesicles.

Horowitz<sup>2</sup> reports a case in which there was inflammation of the left epididymis, prostatitis, inflammation of the seminal vesicles, and swelling of a considerable portion of the left spermatic cord, which was complicated by peritonitis. In this case recovery took place.

According to Zeissl, Wendelin observed a case in which there was much swelling of the vas deferens, together with peritonitis, which ran such a severe course that perforation of the bladder and rectum occurred, and death followed.

Faucon<sup>3</sup> relates a case of epididymitis in which there were severe general symptoms, together with a swelling at the internal abdominal ring which extended to the spine of the ilium. It was regarded as a sub-peritoneal phlegmon, and was incised, but no pus was let out. Recovery took place.

Peter<sup>4</sup> reports a fatal case, with the post-mortem findings, which is interesting. The patient was a boy sixteen years old who had gonorrhœa and epididymitis. He was attacked by the usual symptoms of acute peritonitis, which eventuated in death. At the autopsy diaphragmatic pleurisy, general peritonitis, and engorgement of the liver and spleen, were found. The urethra was red in its anterior part, pale in the posterior. The right seminal vesicle was healthy, but the left was swollen and contained pus. The surrounding cellular tissue was red and swollen, and the peritoneum

<sup>1</sup> "Péritonite causée chez l'Homme par Uréthrite blennorrhagique," *Annales des Mal. des Org. Gén.-urin.*, 1893, vol. xi. pp. 481 et seq.

<sup>2</sup> "Ueber Gonorrhöische Peritonitis beim Manne," *Wiener med. Wochenschrift*, 1892, Nos. 2 and 3.

<sup>3</sup> "De la Péritonite et du Phlegmon sous-peritonéal d'origine blennorrhagique," *Arch. gén. de Méd.*, 1877, vol. ii. pp. 385 and 545.

<sup>4</sup> *L'Union médicale*, 1856, No. 141, p. 562.

in contiguity with it was strongly hyperæmic. The left vas deferens was swollen, and in intimate contact with the peritoneum which surrounded it.

It is evident that in this case the infection of the peritoneum took place through the seminal vesicle and vas deferens.

**Treatment.**—The patient must be put to bed as soon as the prodromal pains are felt. If he is of vigorous build, leeches may be applied over the painful part. Then hot poultices must be kept continuously over the abdomen. Opium should be given internally, and all symptoms treated according to their indications.

## CHAPTER XXVI.

### CARDIAC AFFECTIONS AND PYÆMIA.

#### Cardiac Affections.

So many well-attested cases have been reported, particularly within the past ten years, in which cardiac lesions of varying degrees of severity have developed during the course of acute and chronic gonorrhœa that there is now no longer any doubt of their origin in this virulent infectious process. Cardiac complications of gonorrhœa, however, are very rare, since in all less than fifty cases have been reported. The male sex seems to be the one most liable to heart complications during gonorrhœa, for there are only two instances on record in which they occurred in women. In the majority of cases cardiac lesions are associated with or follow gonorrhœal rheumatism as complications of gonorrhœa.

The fibrous and serous structures of the heart are the parts primarily attacked, the endocardium most frequently, and the pericardium in a smaller percentage of cases.

The essays of Marty<sup>1</sup> and Gluzinski<sup>2</sup> show very clearly that there are some cases in which the symptoms are comparatively mild, and in which recovery, though in most cases with impaired heart, may occur. In such cases the patients complain of a "stitch" in the left chest and palpitation of the heart, whose action is accelerated and increased. Sometimes a slight pericardial crepitant râle may be heard. In the mild endocardial form we find palpitations, the prolongation of the first sound, with roughness and frequency of the pulse. There may be præcordial dulness and distress, and *bruit de souffle* at the base with the first sound. Soft blowing murmurs are sometimes heard at the apex. It is thought that the aortic valves are more commonly attacked than the mitral.

In some of these milder forms of cases the cardiac complication may be ushered in by rigors, fever, and intense headache, which are soon followed by dyspnœa, palpitations, and the symptoms given above. MacDonnell<sup>3</sup>

<sup>1</sup> "De l'Endocardite blennorrhagique," *Arch. gén. de Méd.*, vol. ii., 1876, pp. 66 et seq.

<sup>2</sup> Epitomized from the Russian in *British Med. Journal*, May 11, 1889, p. 1084.

<sup>3</sup> "Cardiac Complications in Gonorrhœal Rheumatism," *Am. Journ. Med. Sciences*, Jan., 1891, pp. 1 et seq.

reports an interesting case of peri- and endocarditis in which pleurisy with effusion was a further complication. Recovery, however, took place, but the patient was left with a persistent mitral murmur.

The possibility of the onset of cardiac trouble in patients suffering from gonorrhœa should be kept in mind by the surgeon, and if found the patient should at once be put to bed and properly cared for. Gluzinski very pertinently remarks that in these mild cases the patient may still keep on his feet despite the cardiac lesion, and that he is thereby much exposed to heart failure.

There are about ten cases on record in which malignant endocarditis and pyæmia developed as a result of gonorrhœal infection. In these cases the onset was sudden and severe, and attended with chills, high fever, and evidence of profound sickness.

The details of two cases will give a tolerably clear idea of the very grave form of heart troubles following gonorrhœa:

In Weichselbaum's<sup>1</sup> the patient had acute enlargement of the spleen, gonorrhœa (with gonococci-containing pus) of three weeks' duration, and endocarditis, from which he died. At the autopsy the aortic valves were found to be eroded and covered with a grayish and reddish-white mass of vegetations. There was loss of substance in the mitral valve and perforation through the wall of the aorta to the tricuspid valve. The streptococcus pyogenes was found in the vegetations, and was cultivated artificially.

Ely's<sup>2</sup> case was that of a man of twenty-eight who had a urethral discharge, and entered the hospital in a stupid condition. His temperature was 105.8° Fahr., and pulse 130. He became very restless, vomited, and passed urine and feces involuntarily. He was attacked with partial hemiplegia, failed rapidly, and died. At the autopsy the brain, liver, and lungs were found to be congested, the spleen large and soft and the seat of infarctions, and the kidneys large and studded with embolic foci. The aortic valves were normal, but the mitral valves had recent vegetations along the margins. Microscopical examination of the mitral valve showed recent infiltration of the substance of the valve with small round-cells and fibrin, together with erosions of the surface, which were covered with fibrin and teeming with micro-organisms, the principal of which were the staphylococcus pyogenes aureus and the streptococcus pyogenes. The pus from the urethra showed diplococci which resembled gonococci, and a large number of other micrococci.

Schedler<sup>3</sup> has reported a case of malignant endocarditis following gonorrhœa, in which joint-complications first developed, and later on were followed by the heart affection and death.

Thus we see that a very grave, even deadly, form of endocarditis is a very rare complication of gonorrhœa. In these cases, though the heart affection is a very prominent feature, the essential morbid condition is really pyæmia.

This grave disorder seems to be caused by the pyogenic microbes staphylococcus and streptococcus. Much has yet to be learned as to the

<sup>1</sup> "Zur Aetiologie der Acuten Endocarditis," *Centrbl. für Bacteriol. und Parasitenk.*, vol. ii., 1887, pp. 209 et seq.

<sup>2</sup> *Proceedings of the N. Y. Patholog. Society*, for 1888, pp. 155 et seq.

<sup>3</sup> "Zur Casuistik der Herzaffectionen nach Tripper," *Inaug. Dissert.*, Berlin, 1880.



pathology of these cases and of the rôle of the gonococcus and pyogenic microbes. The most concise statement that can now be made is that they are the result of mixed infection.

The **prognosis** in all these cases is grave.

The **treatment** must be based on the indications presented.

### Pyæmia.

Besides the cases of endocarditis and pericarditis which have their origin in urethral suppuration, there are a number of cases of pyæmia, in some of which there were heart-complications, on record, in which the infection was derived from pus-foci near the urethra. Thus, Besançon<sup>1</sup> reports two cases, in one of which the suppuration was in the seminal duct and the epididymis, and in the other in abscess of the neck of the bladder behind old strictures.

Lancereaux reports<sup>2</sup> two cases—one in which the infection was derived from the prostate, and in the other from the testicle. I had under my care a man who died from pyæmia following acute abscess of the prostate, which the attending physician had failed to incise. There are a number of similar cases reported, particularly in Continental medical journals.

Roswell Park, in an interesting essay,<sup>3</sup> reports the case of a man who, following gonorrhœa, had suppuration of the knee-joints and typhoidal symptoms, with high fever, which resulted in death.

Classen<sup>4</sup> reports a similar case of a man thirty-two years old who, after suffering for some time with gonorrhœal rheumatism, was attacked by severe chills followed by profuse sweating, great thirst, accelerated respiration, anorexia, together with a temperature of 104° and 106° Fahr. Death occurred at the end of a month.

Pyæmia may also occur as a result of gonorrhœa in the female sex.

Hutchinson<sup>5</sup> reports in a clinical lecture the case of a young woman who presented typhoidal symptoms, together with pleurisy and bronchitis. The source of the infection was found in a profuse purulent vaginitis of gonorrhœal origin. This woman later on developed abscesses, but finally recovered.

According to Post,<sup>6</sup> Delafield has seen the case of a prostitute who, while suffering from gonorrhœal vaginitis and cystitis, was attacked by rigors and febrile movement, which rapidly passed into a typhoid condition, which ended in death. At the autopsy acute cystitis, pyelitis, and numerous small abscesses in both kidneys were found. A somewhat similar case is reported by Murchison.<sup>7</sup>

Bryant<sup>8</sup> reports the case of a man suffering from urethral stricture, in

<sup>1</sup> "Endocardite ulcéreuse à point de départ génital chez l'Homme," *L'Union Méd.*, 1886, Nos. 100 and 101.

<sup>2</sup> "Endocardite à point de départ génital chez l'Homme," *ibid.*, No. 100.

<sup>3</sup> "Pyæmia as a Sequel of Gonorrhœa," *Journ. Cutan. and Gen.-urin. Diseases*, vol. vi., 1888, pp. 441 et seq.

<sup>4</sup> "Pyæmia as a Sequel of Gonorrhœa," *Albany Med. Annals*, vol. xi., March, 1890, p. 51.

<sup>5</sup> *Philadelphia Med. and Surg. Reporter*, Feb., 1876, pp. 105 et seq.

<sup>6</sup> "Deaths from Gonorrhœa," *Boston Med. and Surg. Journal*, May 5, 1887.

<sup>7</sup> *Transactions of Clinical Society London*, vol. ix., 1879.

<sup>8</sup> *New York Med. Journal*, April 8, 1887, pp. 372 et seq.

which five abscesses seated on the thigh, iliac crests, and near the axilla followed gradual dilatation. I have seen a case in which an abscess of the right sterno-clavicular articulation appeared during the treatment of a urethral stricture by gradual dilatation. Such complications are, however, exceedingly rare.

It is well to remember the old-time cases reported by Voillemier and Villeneuve, in which patients suffering from acute gonorrhœa "broke" their chordee and developed generalized pyæmia, which caused death.

Several years ago I had under observation a case of chronic pyæmia due to an abscess at the side of the bulb, which had developed as a result of a tight stricture just anterior to the part. For nearly a year the patient suffered from irregular and erratic chills and fever, which were sometimes mild and again severe. Nothing then was known of a urethral lesion, for the patient made no mention of such trouble, and quinine and Warburg's tincture were given in large doses without any result. The perineal abscess led to exploration of the urethra and the discovery of a very tight stricture. I performed external urethrotomy, and the patient has since remained well.

A study of the various cases of pyæmia following gonorrhœa shows that some are mild in character and end in recovery, whilst others are of a malignant type and end in death.

## CHAPTER XXVII.

### AFFECTIONS OF THE SPINAL CORD.

WITHIN a few years cases have been reported in which there was inherent evidence that certain spinal affections and symptoms had their origin in urethral gonorrhœa. Such a pathological relation is claimed by Hayem<sup>1</sup> and Parmentier, who report two cases in which spinal symptoms supervened upon gonorrhœal rheumatism, in one case coincidently with a severe attack of gonorrhœal inflammation of many of the joints. Dorsolumbar pain, girdle pain around the lower part of the chest, lightning pains in the lower limbs, extreme hyperæsthesia, motor paresis, exaggeration of the reflexes, and epileptoid trepidation were observed. These symptoms, referable to disease of the cord and its meninges, recurred severely on these occasions coincidently with the articular lesions and the recurrence of the gonorrhœal discharge. In the second case in the second week of acute gonorrhœa the patient was attacked with pain in the region of the crural nerves, double hydrarthrosis, tarsal and tibio-tarsal arthritis, pains in the head, lightning pains, exaggeration of knee-jerks, epileptoid trepidation, tremor and spasm of the limb when the foot was placed on

<sup>1</sup> "Contribution à l'Étude des Manifestations spinales de la Blennorrhagie," *Rev. de Méd.*, Paris, 1888, viii., pp. 433 et seq.

the ground, muscular weakness, and dorso-lumbar pains, followed by muscular atrophy.

These authors refer to a case of double sciatica following gonorrhœa, reported by M. Peter, and to a case of paraplegia of similar sequence reported by Tixier, and another by Stanley,<sup>1</sup> as belonging to the same class. They are emphatic in their opinion that gonorrhœa, like other infectious diseases, may cause affections of the spinal cord in the form of congestion and a meningo-myelitis involving more or less of the lateral and posterior portions of the cord.

Chavier and Fevrier<sup>2</sup> report a case similar to the foregoing of a soldier who suffered from hyperæsthesia of the skin and involuntary movement of the right upper and lower extremities following gonorrhœa. The lower part of the spinal column and the sciatic nerves were the seat of severe pain, the lower extremities were paretic, the reflexes were exaggerated, and there was slight fever. There was also pain in the left knee and hip, with atrophy of the muscles and joint structures. A cure is said to have been produced in a month.

Jaroschewski<sup>3</sup> reports a case of gonorrhœal rheumatism which was complicated by marked atrophy of the gastrocnemii muscles, exaggeration of the patellar reflexes, and foot-clonus. This patient had previously suffered from mild aphonia, hemicrania, and diabetes insipidus. Jaroschewski thinks that in cases of involvement of the spinal cord by gonorrhœa there is a predisposition of the nervous system to inflammation—a condition of *locus minoris resistentiæ*.

Dufour<sup>4</sup> reports the case of a young man who in the third month of gonorrhœa was attacked by violent pains in the lumbar region, which lasted for a day, and were followed by a tingling sensation in the lower extremities, diminution in power and motility, and soon after complete paraplegia. There were also paralysis of the bladder, rectal incontinence, and exaggeration of the patellar reflexes. Later on there was loss of sensibility of the lower extremities, which were the seat of reflex shocks. General atrophy of muscles and lightning-like pains also developed. Death occurred in a crisis of dyspnœa.

A study of the various published cases, according to Dufour, shows many clinical differences. The lesion in the medulla varies in its seat, its gravity, and its tendency to extension. The symptoms are mainly those of motility and sensibility, and they may be mild or severe. The most common clinical picture is that of dorso-lumbar myelitis, partial or diffuse, acute or subacute, with moderate fever, pains in the spinal cord, girdle pains, tingling sensations, muscular shocks or spasms in the lower limbs, rapid loss of sensibility and motility, troubles in urination and defecation, and some trophic troubles. The course is that of all infectious myelites, and the prognosis is death in one-third of all cases.

The lesion is due to microbic infection primarily of the fibrous structures of the coverings of the spinal cord.

We have no knowledge as yet as to the part played by the gonococcus

<sup>1</sup> *Med.-Chir. Transactions*, 1856.

<sup>2</sup> "Manifestations spinales de la Blennorrhagie," *Revue de Méd.*, 1888, viii., pp. 1020 et seq.

<sup>3</sup> "Ein Fall von blennorrhoidischen Rheumatismus mit nachfolgenden spinalen symptomen," *St. Petersburg med. Wochenschr.*, 1890, No. 5.

<sup>4</sup> "Des Meningo-myélites blennorrhagiques," *Thèse de Paris*, 1890.



in this formidable affection, nor do we know that it is in any way caused by a mixed infection. We have no knowledge of the involvement of the cerebral meninges by the gonorrhœal process.

Panas<sup>1</sup> reports the case of a man in the declining stage of gonorrhœa who after exposure to cold had a severe chill followed by headache lasting for ten days, and the loss of the sight of one eye. Severe optic neuritis, passing to atrophy, was found in the blind eye, and mild neuritis in the opposite one. Panas thinks that the trouble began in meningitis, and then spread to the roots of the optic nerves, and that it was of gonorrhœal origin.

## CHAPTER XXVIII.

### CUTANEOUS AFFECTIONS.

WITHIN the past twenty-five years, and particularly within the past ten years, many authors, notably in France, have written essays in which cases of gonorrhœa complicated with acute skin eruptions have been reported. As a result of these contributions it is quite widely conceded that gonorrhœal infection may give rise to dermal inflammation. Such a proposition carries with it nothing of a startling character, now that we know that the infectious agent of the disease, its morbid secretions or toxines, together with other pyogenic microbes, can be directly absorbed into the circulation. The only singular part of this question is that so many careful observers who have seen and studied a vast number of cases of gonorrhœa have lived and died and have never mentioned having seen a case. I have many times seen patients suffering from acute and declining gonorrhœa who have been attacked by eruptions resembling scarlatina, measles, œdematous erythema, and urticaria, and in some instances I have failed to find that gastric disorder produced by antiblennorrhagics has been the exciting cause. In my experience copaiba, cubebs, and oil of santal-wood are the most common causes of skin affections during gonorrhœa.

Perrin,<sup>2</sup> in an essay in which he analyzes the recorded cases, and from which the reader can obtain the bibliography of the subject, reports a case in which a scarlatiniform eruption occurred in a gonorrhœa patient who had not taken antiblennorrhagics. Other cases have been reported by Besnier, Klippel, Mesnet, Andret, and others. Some of these cases seem convincing, while in others the statement that the patient had taken copaiba, cubebs, and oil santal several days before the onset of the eruption gives rise to doubt.

Several cases have been reported in which purpura was said to have

<sup>1</sup> "Névrite Optique blennorrhagique," *La Semaine médicale*, 1890, p. 477.

<sup>2</sup> "Des Déterminations cutanées de la Blennorrhagie," *Annales de Dermat. et de Syphil.*, 1890, pp. 773 and 859 et seq.

been produced by gonorrhœa. Their details, however, do not carry absolute conviction with them, since the exclusion of other infections is not clearly made out. Finger<sup>1</sup> reports three cases in which gonorrhœa and cystitis were complicated by purpura rheumatica, and in one of them pleurisy coexisted. In these cases relapses of the gonorrhœal process were followed by renewed joint-swellings and purpura. Balzer and Lacour<sup>2</sup> report the case of a young man who during an attack of severe urethro-cystitis also suffered from a grave form of purpura hæmorrhagica. Microscopical examination and cultures of the urethral secretion showed gonococci and other microbes. Similar studies with the blood demonstrated the presence of a large white staphylococcus. Other cases have been reported by Mathieu and Lailler.

The most common of these eruptions are those of the acute erythematous and the multiform erythematous varieties. There is usually much gastric disorder and more or less fever in the course of these exanthemata.

Vidal<sup>3</sup> has reported a case which is unique in medical literature. It was that of a man twenty-four years old who, after two attacks of gonorrhœa (the interval between which being two years), had polyarthritis and a generalized eruption of symmetrical horny plaques or crusts, together with loss of the nails. In each attack the cutaneous lesions were similar. It must be conceded that our knowledge of the relation of these various dermal inflammations to gonorrhœa is yet wanting in many essential points.

### Eruptions following the Ingestion of Antiblennorrhagics.

The ingestion of copaiba in some patients causes eruptions, chiefly of the erythematous type, which usually appear on the hands, arms, feet, knees, trunk, chiefly anteriorly, and also, rather exceptionally, on the face. In some cases a rash strikingly similar to scarlatina is produced, and less commonly the rash resembles measles. The most common rash is a diffuse, irregularly patchy eruption of rose-colored or deep-red spots of gyrate outline, grouped or discreet. In some cases distinct papulation and vesiculation may occur intermingled with the general rash. Urticarial plaques, together with small papules, may constitute the whole eruption, or these lesions may be intermingled with the erythematous rash.

Copaiba rashes usually appear very suddenly, and are often accompanied by pruritus, which may be intense or mild. With the discontinued ingestion of the drug the rash rapidly fades away, leaving some desquamation for a few days. In some cases small doses of copaiba at once cause an acute and general cutaneous outbreak, while in others the drug may be taken in good-sized doses for some time before the outbreak occurs. There is generally more or less gastro-intestinal disturbance accompanying copaiba exanthems. Cubebs under similar conditions may cause a general acute miliary papular eruption and rashes resembling scarlatina and measles.

<sup>1</sup> "Ueber Purpura rheumatica als Komplikation blennorrhagischer Prozesse," *Wien. med. Presse*, 1880, pp. 1532, 1564, and 1593.

<sup>2</sup> "Uréthro-cystite blennorrhagique compliquée d'emblée de Purpura infectieux très grave," *Annales de Derm. et de Syphil.*, Sept., 1894, pp. 1015 et seq.

<sup>3</sup> *Bulletin de la Société franç. de Dermat. et de Syph.*, 1893, pp. 6 et seq.

Copaiba and cubebs in combination not uncommonly cause rashes similar in all respects to those just described.

Oil of santal-wood is very rarely the cause of cutaneous eruptions. In the few cases which I have seen the rashes resembled scarlatina and measles.

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## CHAPTER XXIX.

### LYMPHANGITIS AND ADENITIS.

#### Lymphangitis.

IN the early days and throughout the acute stage of gonorrhœa the inflammation may extend to the lymphatics of the penis, and it may localize itself in the inguinal ganglia. Gonorrhœal lymphangitis may either be seated in the principal trunks or in the reticular network of these vessels.

I. In the former instance the course of the inflamed lymphatics can be traced as reddish lines, running, as is usually the case, along the dorsum of the penis from the prepuce toward the pubes. There may be one or several. In the latter case they may be united by transverse bands of erythema corresponding to the anastomoses of the vessels. To the touch they resemble hard or knotted cords which can be separated by the fingers from the adjacent tissues. Their sensitiveness varies with the amount of inflammation. There is often some œdema of the prepuce or of the penis, and tenderness of the inguinal ganglia. This state of things almost invariably terminates in resolution. Suppuration is reported to occur in rare instances in the form of several small circumscribed abscesses, which are usually of little moment, but which may undermine the skin to some extent and demand surgical interference. Zeissl says he knows men who have lymphangitis every time they have the clap.

Fournier speaks of another form of this affection taking place (*à froid*) without any signs of acute inflammation, and recognizable only by the hard and indolent cord or cords perceptible to the touch along the dorsum of the penis, and readily mistaken for the indurated lymphangitis attendant upon the initial lesion of syphilis.

Inflammation of the lymphatic trunks along the dorsum of the penis has been mistaken for dorsal phlebitis. According to Fournier, the latter is an exceedingly rare affection, a few cases having been seen by Ricord. It is distinguishable from the former by the greater amount of œdema, by the impossibility of grasping and isolating the vessel between the fingers, and by the inguinal ganglia remaining unaffected.

II. The second form of lymphangitis, the one in which the general reticular network of the lymphatic vessels is involved, is usually confined to the prepuce, and is responsible for many of the cases of phimosis and paraphimosis and their sequelæ (abscesses, perforation of the prepuce, etc.)



which have been described in another chapter. The part affected is of a uniform rose or red color, more or less tumefied and exceedingly sensitive. The trunks of the vessels along the dorsum and the glands in the groin usually show signs of participation.

In very rare cases the whole penis is involved, attains an enormous size, is twisted upon itself at its extremity, and is the seat of the most violent pain. Micturition is difficult and painful, erections excruciating. General febrile reaction, chills, fever, loss of appetite, and even delirium (it is said), may occur.

In most cases even these severe symptoms terminate without any toward result. Suppuration, however, is a consequence to be feared. "When this takes place it is almost always seated in the prepuce. Very rarely it involves the cellular tissue lining the sheath of the penis. The abscess shows great tendency to destroy the mucous membrane of the prepuce and to empty itself toward the glans. When finally emptied, the swelling of the prepuce subsides, the tension disappears, the pains cease, and the skin can be felt to be thinned at the point affected. In some cases this thinning of the skin is so great that the membrane loses its vitality and is affected with gangrene. A perforation results, through which the glans may be seen. This accident is not the only one to which the patient is exposed. One of the most common, and at the same time least serious, consists in a hard œdema limited to that portion of the prepuce corresponding to the frænum, and which may be very persistent. In other patients the edges of the opening of the abscess become indurated, and it is then difficult to uncover the glans. Finally, in persons predisposed to phimosis there remains a narrowness of the preputial orifice or an induration of the whole membrane" (Hardy).

**Treatment.**—The treatment of gonorrhœal lymphangitis consists in rest in the horizontal posture, elevation of the genitals, full baths, local bathing with hot water, and incision of any abscess as soon as formed. Rules for treatment in cases of phimosis have already been given.

### Adenitis.

It is rare to observe anything more serious in the inguinal ganglia in cases of gonorrhœa than slight enlargement and tenderness, which disappear in a few days. It is at once recognized by the physician and patient by the enlargement and tenderness of one or more glands in the groin, and it may occasion considerable pain and uneasiness in walking and standing. Buboës attendant upon gonorrhœa, uncomplicated with chanroid, are "simple" buboës, of which a fuller description will be given hereafter in speaking of buboës in general. They may generally be made to disappear in a few days by keeping the patient quiet and applying ice or cooling lotions, and later on producing a little counter-irritation by painting the skin over them daily with tincture of iodine.

Gonorrhœal adenitis very rarely goes on to suppuration, except in very debilitated or tuberculous subjects. As a rule, the swelling in the ganglia entirely passes away, but exceptionally these little bodies are left in a somewhat swollen condition, and more or less severe recrudescences of the inflammation follow active exercise or redevelop with a succeeding attack of gonorrhœa.

As a rule, both lymphangitis and adenitis are the result of the too actively aggressive treatment of gonorrhœa or of unusual bodily strain.

According to my statistics, adenitis in the course of gonorrhœa in private practice is of the very greatest rarity, and in public practice it occurs about once in one hundred cases.

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## CHAPTER XXX.

### GONORRHŒA IN THE FEMALE.

WITHIN the past ten years our knowledge of gonorrhœa in the female has been very much amplified, many doubtful and obscure points in its nature and diagnosis have been cleared up, and a flood of light has been thrown upon a series of grave consequences which supervene in its course. While to-day it may be said that our knowledge rests on a very satisfactory scientific basis, there are still many points which have yet to be investigated, and several questions concerning it which perhaps may be solved in the future. Undoubtedly, the studies and investigations made by gynecologists have been the chief means of enlarging and rendering more clear our ideas upon this once most obscure and much-neglected subject. It also must be admitted that the discovery of the gonococcus has been a very great help, since by its study we have been able in the main to distinguish the mucous-membrane inflammations produced by it, and to quite sharply distinguish them from the simple forms of muco-purulent and purulent inflammations due to other causes. In earlier days the free escape of very green pus from the uterus and vagina was considered indubitable evidence of gonorrhœal infection, and a gelatinous, mucoid secretion in fluid or plug-form from these parts was regarded as evidence of a simple non-infectious process. To-day, in the light of our more extended and precise knowledge, we find that the pus-secretion may be harmless, while infection may, in some cases, lurk in the seemingly innocent mucous plug.

Notwithstanding our enlightenment, it must be confessed that there are many clinical points which have not been cleared up by the use of the microscope. In a large number of cases male patients suffering from gonorrhœa in the pus of which the gonococcus is readily detected have contracted the disease from females similarly affected. On the other hand, particularly in private practice and in the better class of patients, we frequently see men having gonorrhœa, even first infections, which they contracted from females who were never infected with that disease, who may not have had any abnormal discharge, or who might have had a purulent or muco-purulent discharge as a result of simple processes—parturition, some new growth, or of some traumatism. In these cases the microscope gives us no help. The ardent advocates of the absolute and essential virulence of the gonococcus claim that in these cases there must have been in times past a gonorrhœa which was not recognized, and that faulty or insufficient search and examination had allowed the microbe to escape

detection, or that this never-dying micro-organism existed in an involution form and was unrecognizable by means of our present methods of examination. While, therefore, we may regret that our knowledge is not complete and clear, we certainly should be thankful that it has been so broadly increased and so materially systematized.

Gonorrhœa in the female is certainly much less frequent than it is in the male, and usually runs a much less definite course. There being so much more surface of mucous membrane in the genito-urinary tracts of the female, and so many more communicating mucous-membrane passages than in the male, there is a corresponding complexity in the situation and course of the disease. In the main, gonorrhœa in women localizes itself in one or two parts, runs an acute course, becomes subacute, and ceases. Then in many cases it begins and remains in a subacute condition for a considerable or a long time. Then, again, in some cases it progressively invades the whole genital tract.

Having become lodged in the cervix uteri, it may extend to the body of that organ, may pass through the ostia interna, attack the tubes and ovaries, and then the peritoneum. As the infectious process creeps higher up, the gravity of the disease increases and the sufferings of the patient are much greater. Then, localizing itself in the tubes and the ovaries, it produces foci of inflammation which lead to structural changes in the pelvic connective tissues, and may cause intermittent attacks of peritonitis. Patients thus afflicted are usually sterile, they suffer intense discomfort and pain, their health becomes impaired until they may become mental and physical wrecks. Not only do they become the subject for capital operations, but they lapse into a condition of poor health which renders them the prey to acute infectious diseases particularly tuberculosis.

These sad results certainly do occur in a relatively quite large number of cases. Instances are not infrequent in which wives are infected with gonorrhœa by their husbands, who perhaps regarded themselves as cured. So that, instead of being a trifling affair, gonorrhœa is in many cases really a very serious disease, and it constitutes a grave social danger.

In some cases—not very common ones, however—the bladder becomes infected by extension from the urethra, and from there, creeping up the ureters, the disease settles in the kidneys, producing pyelitis and pyelonephritis. In these cases of ascending gonorrhœa in women the symptom-complex is very similar to that observed in men.

It is very difficult, and even impossible, to get reliable statistics as to the frequency of occurrence of acute gonorrhœa in women. It of course exists largely in prostitutes, particularly in quite young ones and those of the lower walks of life, and it is not uncommon in shop-girls and others who for various reasons leave their homes and cease to be under parental and family restraint.

Fournier's statistics as to the class of women from whom gonorrhœa is most frequently derived are interesting:

Public prostitutes . . . . .	12
Clandestine prostitutes . . . . .	44
Kept women, actresses . . . . .	138
Shop-girls . . . . .	126
Domestics . . . . .	41
Married women . . . . .	26
	<hr/> 387



The word "actress" used in these statistics is rather misleading. There is no doubt whatever that gonorrhœa exists in full-fledged actresses, but not to the extent implied by this table. These figures refer to young women in general, usually under and not much over twenty years of age, who are employed in various capacities in theatres, music-halls, and "dives." They dance in the ballet, sing in the chorus, and are otherwise employed in these places. Usually these girls have but indifferent notions as to personal cleanliness. They are unsophisticated and not suspicious of men, and thus fall victims of gonorrhœa. Carelessness of person and indifference to discharges from the genitalia cause them often to allow their disease to run on, while at the same time they accord favors to many men. Thus it is that these women so frequently give gonorrhœa to men.

There are several reasons why gonorrhœa in women not infrequently passes unrecognized. In many cases when the urethra is involved the acuteness of the symptoms cease rather promptly, and the woman simply thinks that something is mildly amiss or that she has taken cold. Then, again, invasion of the cervix uteri may be attended with mild symptoms which do not alarm the patient, and which may exist for a time, long or short, without the knowledge of the patient. In other cases many women have suffered so long from vaginal discharges, muco-purulent and purulent, that they become quite indifferent to them, and any increase of their quantity does not in many instances cause them to seek medical advice.

As regards the frequency of gonorrhœa as found in patients who seek relief at the hands of gynecologists, we have considerable quite accurate information. Thus, Schwartz<sup>1</sup> in 617 cases found 112 in which gonorrhœal infection was the probable causative factor. Of these 112 cases, 33 (5.3 per cent.) suffered from acute gonorrhœa (the gonococcus having been found), and of these 19 were either unmarried or widows. Of the remaining 79 cases, the gonococcus was found in 44, and, though absent when looked for, Schwartz thinks from their clinical histories it had been present in the remaining 35 cases. Taking, therefore, only the 77 cases in which the gonococcus was found, out of the 617 cases gonorrhœa was proved to exist in 12.4 per cent.

Sänger<sup>2</sup> in 1930 gynecological cases in private and hospital practice found 230 of gonorrhœal origin, being 12 per cent., or one-eighth of all the cases. In 161 later cases there were 29 of gonorrhœal origin, which would be 18 per cent. As a general statement, he thinks that in one-eighth of all gynecological cases gonorrhœa is the underlying cause.

Steinschneider<sup>3</sup> examined 55 prostitutes in the venereal hospital of Breslau, and of these 20 presented no symptoms of gonorrhœa. But of the remaining 37 cases, in 34 there was recent gonorrhœa, and in 3 the infection had existed three, four, and five months. In the urethral secretion of the 34 cases the gonococcus was found, but it was absent in the urethral secretions of the 3 chronic cases.

Laser<sup>4</sup> examined 198 prostitutes, and from their secretions 600 specimens were examined. Of these, 353 were from the urethra, 180 from

<sup>1</sup> "Die Gonorrhœische Infektion beim Weibe," *Volkman's Sammlung klin. Vorträge*, No. 279, 1886.

<sup>2</sup> *Die Tripperansteckung beim Weiblichen Geschlecht*, Leipzig, 1889.

<sup>3</sup> "Ueber den Sitz der Gonorrhœischen Infektion beim Weibe," *Berl. klin. Wochenschr.*, No. 17, 1887, p. 301.

<sup>4</sup> "Gonococcen befund bei 600 Prostituirten," *Deut. med. Wochenschr.*, No. 37, 1893, p. 892.

the vagina, and 67 from the cervix uteri. Of the 67 cases, in 21 the gonococcus was found, that being 30.3 per cent. In these 21 cases there were clinical symptoms present in only 4. In the 180 cases of vaginal discharge gonococci were found in only 7, and in 5 of these cases the cervical discharge contained gonococci. In only 1 case was it evident that the microbe grew in the vagina. Of the 353 specimens of urethral pus, the gonococcus was found in 112 cases, which is 31.7 per cent. The result of the 353 examinations of the urethra gives gonococci in 112 cases, in 61 cases of which there was no symptomatic evidence of gonorrhœa. The gonococci were alone in but few cases; leptothrix was present in 6 cases. Among the 241 cases in which no gonococci were found, follicular catarrh was present in 17; the mucous membrane was red and swollen in 19. In 31 cases there were signs that would lead one to suspect gonorrhœa. In 8 of these cases a thick purulent discharge could be squeezed out of the urethra, and in the other 23 cases a more mucoid discharge was present. From his studies Laser has convinced himself that other micro-organisms besides the gonococcus may produce purulent discharge in the female genital tract.

In the light of recent investigations and studies it is clearly proved that in women over twenty years of age the urethra and the cervix uteri are the parts most commonly attacked by gonorrhœa. There is some discordance in opinion as to the relative frequency of these two forms of gonorrhœa, but a conservative estimate, I think, will place the urethral trouble as a little more frequent than that of the os uteri. There can be no doubt of the existence of a true gonorrhœal inflammation of the vulva, but it is not very common. It is sometimes seen in young girls over fifteen and less than twenty years of age, usually as a result of their first infection and of their earlier attempts at intercourse.

Though the existence of a gonorrhœal vaginitis has been denied, there can be no doubt that in a restricted number of cases gonorrhœa primarily attacking this tube does occur. It is also not infrequently observed to become secondarily infected by the gonorrhœal secretion from the os uteri.

Most commonly, therefore, gonorrhœa is found in the urethra, cervix uteri, vulva, and vagina.

These are the four principal forms of gonorrhœa in women, and from them the many complications of the genital and urinary parts above may develop. One or more, and perhaps all, of these forms may exist in a given case. Sometimes we find simply gonorrhœal urethritis, or coexistent with it may be vulvitis and even endocervicitis. Then, again, we find inflammation of the uterine neck as the sole trouble, or it may be attended with vaginitis and urethritis. In other words, while the urethra and cervix uteri are the parts most commonly attacked, other parts may severally or in totality be coincidentally involved. In some cases follicular and glandular inflammation may be present with any of the foregoing inflammations or combinations.

There are also certain minor forms of gonorrhœa which are localized in the peri-urethral and intra-urethral follicles and in Bartholin's glands.

The essential gonorrhœal process in women has been carefully studied by Bumm,<sup>1</sup> both microscopically and clinically, in 132 cases, and it is

<sup>1</sup> "Ueber die Tripperansteckung beim Weiblichen Geschlecht und ihre Folgen," *Münch. med. Wochenschr.*, 1891, pp. 853 et seq.

from his essay that I take the facts of pathological histology. The morbid process is similar to that of the male. (See p. 78.) It has a period of incubation of two or three, perhaps even more, days. The microbes, being deposited on the mucous membrane, luxuriate and greatly increase in numbers. Then they, as already described, pass through the mucous membrane in the clefts between the cells and reach the papillary bodies. The result is an acute exudative inflammation with an abundant secretion of pus. When in favorable cases the morbid process ceases, the epithelium is restored and a cure is produced. There is a tendency, according to Bumm, for the microbes to remain in an indolent state in the sticky mucous secretion of the parts previously inflamed. It has long been contended by Bumm that parts covered with flat pavement epithelium are very resistant, and even impregnable, to the invasion of the gonococcus, and that where cylindrical epithelium covers parts they are readily susceptible to invasion. The consensus of opinion of a number of later observers goes to show that parts covered with flat pavement epithelium are more resistant to the action of the gonococcus than are those covered by cylindrical epithelium, but that they both are susceptible, though in varying degrees.

It is therefore important in the study of gonorrhœa in women to consider the kind of mucous membrane which covers a part. Thus, the vulva, vagina, and the vaginal portion of the external surface of the os uteri are covered with pavement epithelium, which in early life is soft in structure and becomes harder toward puberty. In the vulva, on each side of the introitus vaginæ, in the depression between the nymphæ and the remains of the hymen, Bartholin's or the vulvo-vaginal glands open by means of a long single duct. These ducts become infected in gonorrhœa, which may extend deeper and invade the glands. The urethra also opens into the vulva.

The female urethra is a dense structure composed of yellow and white elastic fibrous tissue in which involuntary muscular fibres are inextricably interwoven. The mucous lining is firmly adherent to the tissue of the canal, and is of the squamous variety in nearly its whole length, while that nearest the bladder is of the transitional type. In the intervals of urination the mucous membrane is thrown into longitudinal folds. There are many mucous crypts, called, as in the male, Littre's glands, lined with columnar epithelium, seated along the course of the canal.

Besides the deep-seated follicles, there are two large racemose glands seated near the meatus, which have been described by Dr. Skene,<sup>1</sup> and are called Skene's glands. He describes them as follows:

"Upon each side near the floor of the female urethra there are two tubules large enough to admit a No. 1 probe of the French scale.

"They extend from the meatus urinarius upward from three-eighths to three-quarters of an inch.

"They are located beneath the mucous membrane, in the muscular walls of the urethra.

"The mouths of these tubules are found upon the free surface of the mucous membrane of the urethra, within the labia of the meatus urinarius. The location of the opening is subject to slight variation, according to

<sup>1</sup> "The Anatomy and Pathology of Two Important Glands of the Female Urethra." *Am. Journ. Obstetrics, etc.*, vol. xiii., 1880, p. 265.



the condition and location of the meatus. In some subjects, especially the young and very aged, and in those in whom the meatus is small and does not project above the plane of the vestibule, the orifices are found about an eighth of an inch within the outer border of the meatus. When the mucous membrane of the urethra is thickened and relaxed so as to become slightly prolapsed, or when the meatus is everted—conditions not uncommon amongst those who have borne children—the openings are exposed to view upon each side of the entrance to the urethra.

“The upper ends of the tubules terminate in a number of divisions, which branch off into the muscular walls of the urethra. By injecting the tubules with mercury and then laying them open the openings of the branches can be easily seen.

“I have called them glands, because they differ in size and structure from the simple follicles that are found in abundance in the mucous membrane.”

Besides Skene's glands, there are certain peri-urethral follicles seated around the urethra one-third or one-half an inch from the meatus. In the third order of glands belong the vestibulo-vaginal glands or bulbs, which are seated on each side of the meatus on its lower part near the vagina. There are also certain para-urethral follicles, which are sparsely scattered over the vestibule in the vicinity of the urethra. All these follicles and glands may play a prominent part in the gonorrhœal process.

There are also a number of large-sized follicles which open upon the fourchette or on the anfractuous surface of the hymen left after its rupture in childbirth, which may be attacked by simple catarrhal processes and by gonorrhœa.

The vagina is covered with a thick, hard, and horny epithelial layer of the flat variety, and into it no glands open. It is the habitat of myriads of various forms of micro-organisms. From the external os uteri to the abdominal openings of the tubes the genital canal is covered by a simple layer of ciliated cylindrical epithelium. In the cervix the acinous glands of Naboth penetrate deep down in the tissues and open on the surface of the mucous membrane. They offer a peculiarly deep and almost impregnable nidus for microbic invasion. Indifferent microbes are found in this part in healthy subjects.

In the body of the uterus the mucous membrane is supplied with tubular glands and lies directly on the muscle without the intervention of any submucous connective tissue. According to Winter,<sup>1</sup> neither the normal uterine cavity nor the tubes contain any micro-organisms or contents of any kind. The tubes possess no glands, and are of succulent structure which will admit of much swelling and distention. In the course of the tubes there are many folds which make of the canal an irregular cavity with many depressions and nooks which are favorable to the long existence of an inflammatory process. The structure and relations of the ovaries are described in works on anatomy and gynecology.

In the light of the foregoing statements, when we take into consideration the facts that gonorrhœa in women, as in men, consists of an exudative inflammation of the submucous connective tissue, and that the genital organs of women are so extensive, complex, and involuted, and so profusely

<sup>1</sup> “Die Microorganismen im Genitalcanal der Gesundenfrau,” *Zeitschr. für Geburtsch. und Gynäk.*, Stuttgart, 1888, vol. xiv. pp. 443 et seq.

supplied by blood-vessels which frequently undergo normal engorgement, it can readily be understood why the morbid process may show a tendency to become chronic and to lurk and to hide in them.

Although gonorrhœa in women in many cases is a very persistent and chronic affection, it certainly must not be pronounced an incurable one.

### The So-called Latent Gonorrhœa.

There has been a tendency developed within the past ten years to refer in a loose and unscientific manner nearly all female ailments to gonorrhœa, and attribute to many husbands who in earlier days had gonorrhœa a gonorrhœal infection of their wives, which produced serious pelvic inflammations which, besides causing sterility, often entailed lifelong suffering and invalidism, and frequently ended in death.

In the year 1872, Dr. E. Noeggerath<sup>1</sup> made the bold statement that, as claimed by Ricord, 800 out of every 1000 men living in large cities had gonorrhœa, from which he, Noeggerath, claimed they never recovered. On marrying, these men earlier or later infected their wives, 90 per cent. of whom then suffered from the ravages of gonorrhœal infection. Though these views were vehemently combated by many and were accepted by only a few, Noeggerath<sup>2</sup> still clung to them, and in a paper read in 1876 he formulated the following conclusions:

1. Gonorrhœa in the male, as well as in the female, persists for life in certain sections of the organs of generation, notwithstanding its apparent cure in a great many instances.

2. There is a form of gonorrhœa, which may be called latent gonorrhœa, in the male as well as in the female.

3. Latent gonorrhœa in the male, as well as in the female, may infect a healthy person either with acute gonorrhœa or gleet.

4. Latent gonorrhœa in the female, either the consequence of an acute gonorrhœal invasion or not, if it pass from the latent into the apparent condition, manifests itself as acute, chronic, recurrent perimetritis or ovaritis, or as catarrh of certain sections of the genital organs.

5. Latent gonorrhœa on becoming apparent in the male does so by attacks of gleet or epididymitis.

6. About 90 per cent. of sterile women are married to husbands who have suffered from gonorrhœa, either previous to or during married life.

These extreme and exaggerated views of the result of generalization and deductions based on faulty diagnosis and false premises are not quoted here with approval, but simply as a matter of medical history.

Since the discovery of the gonococcus Noeggerath's views have attracted wide attention, and they certainly have been of great benefit in causing gynecologists, syphilographers, and bacteriologists to study gonorrhœa in women from all standpoints. Unfortunately, gynecologists, as a rule, know little, if anything, of gonorrhœa in men, and many of them, not having gone into its study carefully, think that the gonococcus hides, but never dies, and that a husband, once having had gonorrhœa, must of necessity be the cause of nearly every pelvic inflammation his wife may

<sup>1</sup> *Die Latente Gonorrhœe im Weiblichen Geschlecht*, Bonn, 1872.

<sup>2</sup> "Latent Gonorrhœa in the Female, etc.," reprint from the *Transactions of the American Gynecological Society*, 1876.

suffer from. Syphilographers may see the early gonorrhœas in women, but they rarely see these cases when they become gynecological. Hence the present unsettled condition of our knowledge as to just what gonorrhœa is responsible for in female uterine and pelvic inflammations. The views of many gynecologists concerning gonorrhœa may be stated about as follows: Some of them, with propriety, claim that there is first an acute attack, and that this becomes subacute and then chronic. In the chronic form it may cease or may lurk indefinitely, and may then undergo exacerbations which may lead to grave pelvic trouble. On the other hand, according to many observers, the acute form of the disease in women is rare, but a latent form of the whole genital tract is very frequent. Gonorrhœa in men is thought to exist in a low, smouldering form for years without producing any symptoms, and this latent form may be transmitted in coitus to the wife, who will only receive latent gonorrhœa, which for a long or short time may cause no symptoms, and of the existence of which the woman may be ignorant. The explanation of this curious mode of infection is that the infecting secretion of the male is deposited in the female genitals, and there lies dormant until some cause like menstruation, pregnancy, or instrumental manipulation produces conditions favorable to its resuscitation, when it again becomes hostile and produces disease.

One gentleman very naïvely states that "the gonococci are few and decrepit, probably altogether absent from the periodic emissions of a continent man. It is only the post-nuptial sexual excess that rouses them into sufficient vigor to be harmful."

Of this vague form of gonorrhœa Feliki<sup>1</sup> very pertinently remarks: "According to this theory, the gonococci, having penetrated into the female genital tract, coming as they do from a latent gonorrhœa in the male, do not cause the well-known typical gonorrhœa, but a morbid process whose beginning we cannot observe, and whose later stage would correspond to the well-known complications of a typical gonorrhœa. It is remarkable that according to these observers it is not possible in gonorrhœas to discover the gonococcus—first, because these microbes disappear among the bacteria that thrive in the female genital tract; and, secondly, because it is impossible to obtain any secretion from the nooks and corners in which they may hide. Thus in the latent gonorrhœa of the female both clinical symptoms and the bacteriological criterion, the gonococcus, are wanting."

As an example of the easy-going manner in which a diagnosis of latent gonorrhœa in women has been arrived at, I will quote from the work of Sinclair,<sup>2</sup> who says that he will "mention in somewhat general terms a few fairly typical cases." Case I. was that of a married woman, aged twenty years, who had been married a year and had not become pregnant. Three months after marriage she complained of inguinal and hypogastric pains, and suffered from menstrual disturbances. She failed in health and strength, and became a dysmenorrhœal invalid, in all probability permanently sterile. The gonococcus was not found in her genital secretions,

<sup>1</sup> "Ueber Sogenannte latente Gonorrhœe und die Dauer der Infektiosität der Gonorrhœischen Urethritis," *Internat. Centralblatt der Harn und Sexualorgane*, vol. iv., 1893, pp. 15-22 and 60-77.

<sup>2</sup> *On Gonorrhœal Infection in Women*, London, 1888, pp. 6 et seq.



and the only evidence of her having had gonorrhœa was that her husband had that disease a year before his marriage, since which he had no signs of it. Other cases in a similar vein are reported.

Now, it certainly will strike a critical reader that such loosely-observed cases, in which the clinical history and the most essential facts are not scientifically ascertained and brought out, but in which almost everything is assumed, are entirely valueless for purposes of study and statistics. Unfortunately, this easy-going method of arriving at a diagnosis has been employed very generally, and as a result gonorrhœa is considered by many as the prime cause of all pelvic inflammations. It is so easy and convincing in the case of a wife suffering from pelvic disease to ascertain that at a more or less remote period the husband has had gonorrhœa, and to fix upon that infection as the origin of the wife's trouble, that some men by routine come to make these diagnoses.

As has been shown elsewhere (see page 72), the gonorrhœal process runs its course, and when not cured a chronic inflammation is left with which microbes have no relation whatever, since they have played their part and disappeared from the scene. In very many cases of chronic urethritis in the male there is simply submucous thickening with purulent secretion, in which no microbes, or at best only indifferent ones, are found. These men cohabit for years regularly with their wives and mistresses, and at intervals with other consorts, and never do them any harm. The reason is that they simply have a low grade of urethral inflammation which has resulted from the initial virulent inflammation. There is a tendency now-a-days to harp upon the longevity of the gonococcus, on its phoenix-like power of resuscitation, and on its relentless virulence. This idea, put forth by some syphilographers, has had undue weight with many gynecologists, who under its influence are led to think that the gonococcus in male and female never dies, but that it is ever ready to produce pelvic mischief. I have seen many cases of young women who have suffered from uterine and pelvic diseases after marriage whose trouble was induced by instrumental manipulation at the hands of energetic young men possessed of an ambition to be known as gynecologists. Minor surgical gynecology is certainly the cause of a great many cases of uterine and pelvic disease. But it is generally so easy to get the husband to acknowledge to having had a previous gonorrhœa, and then to confidentially inform him that he is the cause of his wife's sickness.

In estimating the importance of gonorrhœal infection as the cause of female pelvic trouble we must individualize rather than generalize. Some women having gonorrhœa are not cured, for the reason that their conditions and surroundings are bad, and that they cannot or will not take the trouble to undergo treatment. Some suffer on in sheer ignorance of their peril. But, on the other hand, there are women of the higher walks of life who, having been infected with gonorrhœa, take every means and care to rid themselves of it, and they succeed in many instances. Gonorrhœa of the urethra is pertinacious, but in the majority of cases it is curable if the patient seeks and follows good advice. Gonorrhœa of the cervix uteri is also very persistent and a menace to the woman's health, but it would be rash to say that it is incurable. In clinics and hospitals large numbers of cases of gonorrhœal pelvic diseases are found, and they, when submitted to statistical study, make a formidable showing. But such statistics

should only be taken for what they are worth. I have for more than a quarter of a century treated men and women for gonorrhœa, and in that time have been able to observe a large number of patients during a period of many years. Many young women had gonorrhœa and recovered. They married, bore children, and were healthy and happy. Some few suffered from chronic gonorrhœa, and later developed pelvic trouble. I have the evidence of scores of men, some of whom had gonorrhœa and were cured, others who had chronic urethral discharge from localized patches of thickening or from strictures, who have lived with their wives for years, have cohabited with them without the least injury and without the production of a single symptom referable to gonorrhœa. On this subject the statistics of the late Dr. Thorburn<sup>1</sup> of Manchester are of interest. Thorburn denied the correctness of Noeggerath's conclusions, and appealed to the statistics of 81 families carefully collected by him. He showed that there had been 33 per cent. of male gonorrhœic infections previous to marriage, 26 in all, and, taking all cases of abortion, sterility, uterine and pelvic inflammations, and living births that had occurred in these 81 families, he showed conclusively that there had been the merest fractional difference in their proportion between the previously healthy and not previously infected classes. As regards inflammatory pelvic affections, the balance was fractional in favor of the free-gonorrhœic cases, in other respects equally fractional in favor of the non-gonorrhœic. As bearing upon Dr. Thorburn's evidence the remarks of Dr. Chadwick, made at the time of the discussion of Noeggerath's second paper, are interesting. Chadwick said that he "had ascertained in conversation with twenty different physicians who acknowledged having had gonorrhœa in early life that in no single case had any such symptoms as had been referred to been developed in their wives, and all had had large families of children."

It should be borne in mind, in considering these conspicuously favorable statistics of Chadwick, that the gonorrhœics were physicians who naturally would follow treatment and become cured. The statistics would not show up as favorably if the twenty men were longshoremen or commercial travellers. Intelligence, pecuniary resources, and a life of comparative leisure have much to do with lessening the proportion of gonorrhœal pelvic diseases in the better classes of patients. Ignorance, poverty, and unhygienic surroundings are the underlying causes of so many cases in the lower walks of life.

It is well known that among the myriads of microbes which thrive in the female genitals—the vagina and os uteri especially—the streptococcus and the staphylococcus are frequently found. Doederlein<sup>2</sup> has clearly shown that in the genitals of married women a secretion is found which contains pyogenic microbes. Seeing that these morbid agents infest the normal female genital tract, is it not warrantable to assume that these microbes may become hostile when the condition of the tissues as a result of engorgement, of operations, of examinations, of instrumental manipulations, and of pregnancy becomes favorable to their vital activity? In confirmation

<sup>1</sup> "Latent Gonorrhœa as an Impediment to Marriage," *British Medical Journal*, Aug. 25, 1877.

<sup>2</sup> *Das Scheidensecret und Seine Bedeutung für das Puerperalfieber*, Leipzig, 1892, and "Ueber Scheidenabsonderungen und Scheidenkeime," *Arch. für Gynaek.* 1891, xl., pp. 306 et seq.

of this view we have the evidence of many microscopical demonstrations of pyogenic bacteria which have been found in diseased tubes and ovaries. Menge<sup>1</sup> found in 26 cases of tubal disease the streptococcus pyogenes twice and the staphylococcus albus once, and thinks that he found the gonococcus once. It has struck me as being very singular that so very much insistence is made upon the presence of the gonococcus in the female genital tract (where it is most difficult to find it), and so little is said of the existence of pyogenic microbes which abound there so plentifully and are so easy of detection.

From the foregoing survey of the subject I think we are warranted in throwing out of consideration the mythical and fanciful latent gonorrhœa in women. We shall see a little farther on that gonorrhœa may remain in an indolent condition, either in the urethra, the cervix uteri, or the parts higher up, but in these cases it is a gonorrhœa with distinct tissue-changes. These gonorrhœas are not myths, since they present determinate symptoms, which may, however, be very mild, and in very many cases their secretions will reveal the gonococcus if it is properly and persistently looked for.

I am disposed to think that Säger's estimate that one-eighth of all gynecological cases is due to gonorrhœal infection is conservative and probably nearly correct. But we need further light. Instead of assumptions and generalizations, close observations and study of cases are needed in order that we may have unimpeachable scientific knowledge.

We now come to the consideration of the various forms of gonorrhœa in women.

In many cases of gonorrhœa in women the history of the period of invasion is very obscure. In some the sudden onset of the affection in a previously healthy woman, in a woman recently married, or in a woman having had but a single intercourse may give positive clues as to the early stage of the disease. In very many cases, however, the patient gives the history of having suffered for a long period with chronic leucorrhœa, and of having experienced an exacerbation, and then examination reveals acute inflammation of the external and perhaps internal genitalia.

### Gonorrhœa of the Urethra.

Gonorrhœa of the urethral canal is the most common form observed in women. Formerly gonorrhœa of the vagina ranked first in importance and frequency, but recent observations and studies, particularly those of Steinschneider,<sup>2</sup> Horand,<sup>3</sup> Aubert,<sup>4</sup> and Éraud,<sup>5</sup> have conclusively proved that the virulent suppuration caused by the gonococcus is most frequently found in the urethra. The disease may be limited to the urethra, and it may exist at the same time with gonorrhœa of the os uteri. In some

<sup>1</sup> "Ueber die Gonorrhœische Erkrankung der Tuben und des Bauchfells," *Ztschr. für Geburtsh. und Gynäkol.*, 1891, vol. xxi. pp. 119 et seq.

<sup>2</sup> "Ueber den Sitz der gonorrhœischen Infection beim Weibe," *Berl. klin. Wochenschr.*, 1887, No. 17, p. 301.

<sup>3</sup> "Note pour servir à l'Étude de la Blennorrhagie chez la Femme," *Lyon Médical*, No. 43, 1888.

<sup>4</sup> "Localisation de la Blennorrhagie chez la Femme," *Annales des Mal. des Org. Gén.-urin.*, 1888, vol. vi. pp. 801 et seq.

<sup>5</sup> "De la Blennorrhagie chez la Femme," *Annales de Derm. et de Syph.*, 1890, vol. i. p. 57.



cases there is a coexistent vulvitis, and, particularly in young subjects, the vagina may also be involved, either as a whole or in part.

Urethral gonorrhœa in the female resembles in some particulars the same form in the male. It has a period of incubation, as shown by experimental inoculations both with virulent pus and the cultivated gonococcus, of about two days, which may, according to Martineau, be protracted to five days.

As a rule, the invasion of the urethra in the female is much the same as in the male. There is the slight tickling and burning sensation, and the same sero-mucous secretion in which little whitish particles may be seen suspended, which under the microscope are shown to be epithelial cells and gonococci. Then, after a prodromal period of a few hours or a day or two, the acute stage develops, with more or less severe burning in the urethra, rendered worse on urination, which soon becomes quite frequent. Examination of the parts shows the urethral orifice to be very red and swollen, with perhaps a pouting prominence of its lips. A greenish-yellow discharge escapes in considerable quantity, and may cause redness and swelling of the parts around and beneath. The presence of the finger-tip inserted in the vagina shows that the urethra is swollen and tender, and pressure from behind forward causes pus to exude from the meatus. The urethra being such a short, nearly straight tube, ending directly in the bladder, that viscus may be early involved in the inflammation. Examination of the urine by the two-glass test will always show how deeply the morbid process has travelled. If the first specimen is cloudy and the second clear, it is certain that the bladder is not involved. If the second specimen is turbid, then it is certain that the bladder has been infected.

In some cases of acute urethral gonorrhœa in women there may be mild febrile movement and malaise. As a rule, their local sufferings are quite acute at this time, and they usually become worse when the bladder is involved. Then in bad cases there is constant tenesmus, and as a result the frequent urinations cause great agony: not infrequently the patient's sufferings are increased by the urine scalding the inflamed contiguous parts.

In the majority of cases of the acute stage of urethral gonorrhœa in the female amelioration of the symptoms begins in about a week or ten days, and even sooner. The burning and scalding become less and less severe, the tenesmus is less imperative, and the urinations become less frequent and painful. The redness and swelling of the meatus subside slowly, and the pus becomes whitish and mucoid. In this way matters grow progressively better until the chronic stage may be reached. Then we commonly see a normal or only slightly red meatus, from which, by intravaginal pressure on the urethra, a drop or two of viscid muco-pus or a thinner milky-looking fluid may escape. In this condition the woman may suffer no discomfort whatever, or she may have a very slight smarting or a sensation of heat on urination.

Microscopical examination of the pus in the florid stage shows pus-cells with many gonococci. As the secretion becomes more mucoid, epithelial cells show prominently in the field, with a diminished number of gonococci. In the chronic stage there are usually found some pus-cells, epithelial cells, a few gonococci, and the usual indifferent microbes. Later

on no gonococci can be seen. In this chronic stage, when the bladder has remained intact, the first ounce of water passed into the first vessel will contain some clumps and filaments of pus and epithelium, while the urine in the second vessel will be clear. When there is a complicating cystitis the urine in the second glass will be nearly as turbid as that in the first glass.

Many women have this chronic form of urethral inflammation for a long time, even for years. Its secretion in the early months is infectious. Later on the process is simply a post-gonorrhœal urethritis, and the pus then is harmless. As a rule, the urethral secretion becomes innocuous in about six months or a year after the date of infection, as I have myself many times seen. This is shown by the impunity with which men cohabit with women who have this emasculated secretion. In its active stages, however, the pus of gonorrhœal urethritis of women is equally as virulent as that of men similarly afflicted.

In the declining and chronic stage of urethral gonorrhœa, in the absence of symptoms and of swelling and redness of the urethral orifice, the way to diagnosticate the trouble is by intravaginal pressure on the urethra from behind forward, or by the examination of the urine which is passed several hours after a previous urination which has cleansed the canal. Women very frequently urinate just before presenting themselves to the surgeon, who then fails to obtain a secretion in the meatus by pressure on the urethra. The woman under suspicion should not be allowed to urinate or use injections on the same day that she applies for examination, and the surgeon should decline to give an opinion if she does.

In chronic urethritis in women it is not common to see the exacerbations of the trouble which are so frequent in men. In the majority of cases the intra-urethral and peri-urethral glands only become infected in the declining stage of the urethritis. Therefore these forms of inflammation will be considered farther on separately. Since there are no mucous follicles along the course of the female urethra beyond the first half inch, as there are in man, we do not, as a rule, find those deep-seated follicular abscesses which are almost peculiar to men.

The morbid appearances of the female urethra affected by gonorrhœa have been studied by Janovsky.<sup>1</sup> In the acute stage the parts are red, swollen, and succulent, and erosions are seen over the surface. Much swelling is seen around Skene's glands. Minute polypoid growths were seen along the canal, and in one case there was distinct membranous desquamation. In the chronic stage a granular appearance was noted as a result of the submucous infiltration. There was also epithelial thickening in localized and diffuse form, and decided prominence to Skene's glands.

Chronic urethritis in women results in some instances in stricture of the urethra,<sup>2</sup> which makes itself evident by increasing difficulty in urination, and sometimes by retention. In women, as in men, urethral stricture may lead to cystitis and to pyelo-nephritis.

<sup>1</sup> "Endoscopische Beiträge zur Lehre von der Gonorrhöe des Weibes," *Archiv für Derm. und Syphilis*, 1891, pp. 911 et seq.

<sup>2</sup> The reader is referred to an elaborate essay on urethral stricture in women and its treatment by Génouville, entitled "Du Rétrécissement blennorrhagique de l'Urèthre chez la Femme, etc.," *Annales des Mal. des Org. Gén.-urin.*, 1892, pp. 832 and 925 et seq.

### Gonorrhœa of the Os Uteri and Uterus.

The frequency and importance of gonorrhœal infection of the os uteri and uterus were really not fully appreciated until within recent times. Though many years ago Rollet<sup>1</sup> published an admirable paper on the subject, gonorrhœa of the os uteri remained obscure among the catarrhal inflammations of this part, and was not accorded a prominent place as a distinct morbid condition.<sup>2</sup> As claimed by Bumm<sup>3</sup> and Steinschneider,<sup>4</sup> this form of gonorrhœa ranks second to urethritis, which is the most common form of the disease in the adult female.

The chief importance of gonorrhœa of the os uteri resides in the fact that from this focus the uterus itself and the parts above in direct anatomical connection may be invaded early or late by the infection.

Gonorrhœa of the os uteri is very probably contracted in intercourse with men who are in the declining stage of acute gonorrhœa. During the acute stage men, by reason of the pain, swelling, and discharge, refrain from coitus, but as the trouble subsides they often weary of continence, have intercourse, and infect their consorts.

The anatomical position of the os is such that in coitus it generally comes in contact with the apex of the glans penis, and then becomes bathed with the ejaculation which carries with it pus from the still inflamed urethra, unless the latter tube has been thoroughly flushed by recent urination. When the vagina is short, and when the uterus rests low in the pelvis, the chances of infection are great. Consequently, when the uterus is placed high up the os may escape infection. The length of the penis and the duration of the sexual act also have bearing upon the infection of the os.

Gonorrhœa of the os uteri may be the sole evidence of a given infection, which may begin in this part, and there remain until cured. It also coexists in many cases with a urethritis of similar origin. Then, again, the pus escaping from the uterine orifice not infrequently infects the vagina, usually in a localized manner, and rarely in the totality of the tube. In only acute and very severe cases is the os infected by extension of the disease from the urethra up the vagina.

According to Martineau,<sup>5</sup> the onset of gonorrhœa of the os uteri may be brusque and accompanied by dull pain and weight in the hypogastrium, with radiating pains over the abdomen, lumbar region, and thighs. With this evidence of local trouble there is fever and all its attendant symptoms. Martineau seems to be alone in the observation of such severe initial symptoms, and probably based his description on cases in which there was extension of the gonorrhœal process from the os to the body of the uterus.

Verchère,<sup>6</sup> while he quotes Martineau's description of symptoms, dis-

<sup>1</sup> "Des Maladies vénériennes et syphilitiques de l'Uterus," *Annales de Derm. et de Syph.*, vol. i., 1869, pp. 100 et seq.

<sup>2</sup> Audry (*Précis des Maladies blennorrhagiques*, Paris, 1894, p. 183), speaking of gonorrhœa of the uterus, says that prior to 1884 an experienced clinician had no hesitation in stating that in 4000 women (venereal cases) treated at the Lourcine Hospital he had observed this affection only in 10 cases.

<sup>3</sup> *Op. cit.*

<sup>4</sup> *Op. cit.*

<sup>5</sup> *Leçons cliniques sur la Blennorrhagie chez la Femme*, Paris, 1885, p. 90.

<sup>6</sup> *La Blennorrhagie chez la Femme*, vol. i. p. 87, Paris, 1894.



tinently states that he never observed such a mode of evolution in his experience at the St. Lazare Hospital.

In the majority of cases gonorrhœa of the os uteri begins in an insidious manner unattended with marked symptoms. The external and internal surfaces of the os become red and swollen, and they give forth a muco-purulent secretion. Some women will complain of excessive discharge, while others, who have long had vaginal secretions, may pay no attention to an increase, even if it is decidedly copious. Thus it is that this affection is seldom seen in its very early days.

When a woman suffering from gonorrhœa of the os uteri is examined by means of the speculum, nothing absolutely characteristic or diagnostic can be seen. The os is swollen, is more or less red, even to a purplish tint. At first the mucous membrane is swollen and has a velvety appearance. From the os a purulent or muco-purulent discharge escapes in large drops, and around the os is a narrow collarette of redness and erosion. Then, when the os is much enlarged, it may be eroded in totality or in part. Sometimes there are many small erosions, and again there may be several quite large ones. Though these erosions are sometimes called ulcerations, they are simply local losses of epithelium, such as we see in tolerably well-marked cases of erosive balanitis. When the inflammatory process runs higher and there is much exudative inflammation, the outer surface of the os presents a mammillated appearance, probably from the swelling and prominence of the muciparous glands. This condition may become so well marked that the appearances of the os resemble those of a very rough orange. Then, again, the surface of the os, in cases of a severe course, may become quite deeply eroded and present, as pointed out by Rollet, the appearance of a deep-red cherry, from which its rind has been peeled off. With a still greater increase in the morbid process, granulations, perhaps a few and perhaps in abundance, may develop on the external surface of the uterine neck and on the contiguous mucous membrane, particularly that part below the posterior lip of the os uteri. These granulations may be of millet-seed size, and they may resemble the papillæ of raspberries and strawberries. In the course of time these granulations may go on and develop into true warty growths, which may further become epitheliomatous. Over the morbid surface we frequently find a film or membrane of thick greenish pus, and from the os a purulent fluid escapes. In many of these cases, when fully developed, the patients complain of dysmenorrhœa and too frequent and too copious menstruation. It is these menstrual symptoms which often cause the patients to seek medical advice, and then a correct diagnosis may be made.

In a goodly number of cases the tissue-changes of the external surface of the os are very slight, consisting of a mild increase of redness with or without moderate erosion.

Even when there is a marked condition of erosion the external epithelium may be restored, while at the same time the morbid process persists in the lumen of the os. The main cause of the chronicity of gonorrhœa of the uterine neck is the localization of the process in the numerous and deeply-seated glands of Naboth with their plentiful blood-supply. As the affection grows old, even if little or indifferent treatment is followed, the discharge in many cases becomes less purulent and more mucoid, so that in its chronic stage this form of gonorrhœa may only give as an objective

symptom the well-known glassy-white mucous plug which hangs from the os so constantly. This plug resembles those of the ordinary simple inflammations of these parts, and, while it frequently contains gonococci in its meshes, there is no visible sign present to denote its virulent character. In many cases the only means of determining the presence of gonococci in the os is to gently curette it, and then examine the detritus microscopically.

Throughout the whole course of gonorrhœa of the os this segment may not be the seat of pain, and its examination by bimanual manipulation may give rise to little if any unpleasant sensation. Pain, however, is quite exceptionally felt, either spontaneously or as a result of physical examination.

Now, it must be confessed that with all the objective phenomena just presented there are no appearances which may not be found in simple troubles of the uterine neck. How, then, can we establish a diagnosis of gonorrhœa? In some cases the facts of an infecting coitus may be established. In others (when the trouble is known or found out) the onset of an endocervicitis in a healthy young woman, who has not been tampered with to produce abortion, who has not undergone any form of minor gynecological treatment, and who has not had any disturbance of menstruation, may cause the suspicion of gonorrhœal infection in coitus. In many cases early in their course it is very easy to find the gonococcus in the pus, which must be taken by means of a platinum loop from within the cervical cavity, the orifice of which has been rendered clean and sterile. Then, again, we frequently meet with cases in which a profuse, very yellow, purulent discharge escapes from the os, in which discharge the most scrutinizing examination fails to reveal the gonococcus and perhaps any hostile microbe. A further surprise often awaits us. From a swollen and eroded or only a mildly-reddened os a glairy mucous plug hangs, which looks so innocent that a diagnosis of gonorrhœa seems unwarrantable. But perhaps the woman may be under suspicion of having given gonorrhœa to a man, and further examination is necessary. Then, the secretion having been gathered and prepared, great is one's surprise to see typical gonococci in large or small numbers. Then, again, in very many of these mucous plugs nothing but a few pus-cells and indifferent microbes are found.

The conclusion warranted by all these facts is, that while it is certain that gonorrhœal infection of the os uteri is of very frequent occurrence, it is often overlooked. It may present no objective or subjective symptoms which distinguish it from simple processes, while the facts of the case may occasionally point to gonorrhœal infection in coitus. In these cases, when recent, the microscope may reveal the gonococcus, and thus dispel all doubt. Then, again, as the morbid process grows old, even the microscopic evidence may grow less and less striking and certain, so that in many cases, in the absence of the gonococcus, it having played its part and disappeared, there is no diagnostic evidence of any kind to prove that the case started out by gonorrhœal infection.

On this subject the words of Ricord<sup>1</sup> deserve to be quoted and emphasized. He says: "Whatever uterine catarrh may be, an experience of more than twenty years has taught me that it is the most common

<sup>1</sup> *Clinique iconographique de l'Hôpital des Vénériens*, Paris, 1862, p. 8.

source of gonorrhœa in men, even when we have not the right to attribute it to a venereal cause."

Gonorrhœa of the os uteri very often presents in a clear manner the fallibility of the doctrine of the gonococcus. In many cases gonorrhœa in men can be traced to gonococci-containing pus or muco-pus from the os uteri of an infected woman. In many other cases, where this is the only segment of the genital tract that is the seat of inflammation, the most elaborately careful examination of the secretion, even when procured by scraping, fails utterly to show any gonococci, while other microbes may be seen. Yet the men who have cohabited with these women may have florid gonorrhœa, with gonococci-containing pus.

In the larger number of cases the gonorrhœal process ceases at the os internum. Whether this normal constriction of the parts has, as claimed by some, any tendency to act as a barrier to the infection, we cannot positively say.

**GONORRHOEAL ENDOMETRITIS.**—By the extension of the gonorrhœal process beyond the os internum the mucous membrane of the body of the uterus is attacked by its characteristic inflammation. When the uterus is attacked, there may be fever, a sensation of heat, and bearing-down pains in the pelvis which radiate to the back. There may also be nausea and vomiting. In this acute form the uterus is tender on pressure, and when practicable bimanual palpation shows that the organ is much swollen in all directions. There may be suppression of the menses or menorrhagia. The uterine secretion is abundant, purulent, or muco-purulent in character, and perhaps mixed with blood, and in it the gonococcus can readily be demonstrated. The vagina is hot and the cervix is red, swollen, and eroded. Where the history of the case points to gonorrhœa, the diagnosis may be made with the aid of the microscope. There are no pathognomonic symptoms whatever, either objective or subjective, by which a positive diagnosis of gonorrhœa can be arrived at. In some cases acute recent gonorrhœa of the husband, followed by symptoms of acute infection in the wife, clearly points to the virulent origin of the process, which may be confirmed by the aid of the microscope.

Acute gonorrhœal metritis passes into the chronic form, in which the diagnosis becomes more and more difficult, since in the absence of a clear history the gonococcus is the only criterion, and this microbe grows less numerous, and even disappears, in proportion as the process grows old. In the chronic stage the case belongs to the domain of the gynecologist (and it is to be hoped that the one consulted is a cool and conservative man), whose advice should be sought unless the attendant is especially skilled in women's diseases.

### Gonorrhœa of the Vagina.

In former years the vagina was looked upon as the stronghold of gonorrhœa in the female, but to-day there are observers who claim that there is no such affection as true gonorrhœa of this part, and that, if this tube is gonorrhœically affected, its infection has been caused by the virulent pus pouring down from the os or the uterus. The reason assigned by Bumm<sup>1</sup> and Steinschneider<sup>2</sup> is that the epithelium of the

<sup>1</sup> *Op. cit.*

<sup>2</sup> *Op. cit.*



vagina is of the pavement variety, which is tough and horny, and fully capable of resisting the invasion of the gonococcus. Bumm says that he kept gonorrhœal pus in contact with the vagina for twelve hours and failed to produce any inflammatory reaction. It is further—and truthfully—claimed that gonococci do not thrive exuberantly in the vagina. Bumm, however, does admit that the mucous membrane of the vagina is soft and susceptible before the age of sexual maturity, and that during that period the parts may be successfully attacked by the gonococcus. Schwartz<sup>1</sup> denies Bumm's contention, and claims that the gonococcus does thrive in the deep parts of the epithelium, and that there may be true gonorrhœal vaginitis without the infection of the uterus.

This position of the ardent advocates of the virulency of the gonococcus is in keeping with many of their attempts to formulate laws based on microscopic and bacteriological investigations. In a measure, they are correct in their claim, but clinical facts must not be utterly subordinated to conclusions reached by study with the microscope. Speaking from the standpoint of both microscopists and clinical observers, the matter may be summed up as follows: True gonorrhœa of the vagina may be found in young girls whose vaginal mucous membrane is yet succulent, and who have not been accustomed to sexual intercourse, which tends to the cornification of its epithelium. In some rather older girls or women, in whom the mucous membrane is still soft and normally quite hyperæmic, gonorrhœal infection may occur. Then, again, in women whose vaginæ possess the normal resistance the continued contact of the gonorrhœal pus from the cervix or uterus produces a localized vaginal gonorrhœa.

In the foregoing considerations we have kept strictly in the line of true gonococcus infections, but clinically we must not be thus hampered, but must go farther. Any one who has seen in a long stretch of years large numbers of women suffering from various venereal diseases, and has observed and studied them carefully, will call to mind many women with chronic purulent vaginitis in the secretion of whom no gonococci could be found, but who in coitus with men communicated to them florid gonorrhœa, in the pus of which gonococci could be found.

Gonorrhœa of the vagina may be local or general, acute or chronic. Very commonly, little can be learned of its onset, since it is liable to occur in women the subjects of uterine or vaginal leucorrhœa. Then, again, women, as a rule, are less communicative and truthful regarding their amours than men are; consequently, the date and source of contagion are always with difficulty, and many times are never, ascertained. Carelessness of the person, and the indifference which comes to many women about vaginal discharges, very frequently tend to prevent the surgeon obtaining a satisfactory history of the case.

When seen early the vagina affected with gonorrhœa presents a dry red surface, which is the seat of a sensation of heat. Very soon a mucoid fluid is seen, which soon becomes muco-purulent. In its fully-developed stage the secretion of vaginal gonorrhœa is a pus of considerable consistence and of a milky color, due to the admixture of large quantities of epithelial scales.

When gonorrhœa of the vagina is due to the extension of the inflammation from the external genitalia, it is attended with all the symptoms

<sup>1</sup> *Op. cit.*

incident to the latter, together with a sense of burning heat which is referred by patients as deep down in the pelvis. The vaginal orifice and carunculæ myrtiformes are reddened, swollen, and eroded, and constantly bathed with pus. In the cases under consideration, if treatment is adopted promptly, only a small portion of the lower vagina may be involved. Untreated, however, the tendency of the disease is to become firmly fixed and chronic, and to localize itself in the upper parts of the vagina, particularly in its posterior fornix or Douglas's cul-de-sac. In some cases it is found to attack the anterior fornix, and in others both recesses, anterior and posterior to the uterus.

Acute gonorrhœa originating in the vagina proper is sometimes seen to involve its lower third, but may occur at any part, particularly on its posterior aspect. When severe and extensive, it gives rise to great suffering in the form of a continuous burning pain in the pelvis, which is much aggravated by motion, walking, and even by sitting down. So great is the swelling of the vaginal orifice, and such is the tenderness, that the introduction of the finger or of an instrument is impossible, and patients beg that the nozzle of the syringe shall not be inserted, and if at all a very small one. When the acute stage is fully developed, the sufferings of the patient are often further increased by the extension of the disease to the urethra and vulva. Under these circumstances her condition is often pitiable, as may well be imagined from the extent of surface involved. The duration of the acute stage is very variable, and depends largely upon the efficacy of treatment and upon the regularity with which it is followed. In general, a week or ten days elapse before topical treatment can be instituted in the vaginal canal. Then much can be done, provided the woman can be kept in bed and properly attended to. But women thus afflicted are, as a rule, careless patients, and, though the gravity of their case be pictured to them in the clearest manner, they in very many instances backslide. Then, again, the recurrence of the menstrual epoch, with its engorgement of the genito-urinary tract and sometimes its irritating secretion, is often a very serious setback. In private and dispensary practice we constantly see these patients reach a subacute condition, and then they disappear, and even in the hospital they often consider themselves well and demand their discharge long before the surgeon deems it prudent.

Subacute gonorrhœal vaginitis is seen in two principal forms—the one limited to the lower segment of the tube, and usually rather more severe on its posterior wall; the other and more frequent one in the cul-de-sac behind the uterus. Besides these, the affection may be seen to be seated anterior to the uterus and in the middle third of the vagina. When occurring in the lower two-thirds of the vagina, the membrane is found to be red, swollen, in places eroded, thrown into large folds, and bathed with pus. When the inflammation is seated low down, the introitus vaginæ and the tissues immediately around it are more or less inflamed.

Gonorrhœa of the posterior vagina or Douglas's cul-de-sac is of not infrequent occurrence. In this position it is very liable to escape detection unless carefully looked for. To this end, the best opportunity for a thorough examination is offered by the genu-pectoral position, though very often, from feelings of delicacy, we cannot insist upon it. The next best position is that of Sims with his own speculum, but it is inferior, in

my experience, to the genu-pectoral position. In the latter Sims' speculum may be used or one made of thin nickel-plated wire, such as is found in the shops. Thus exposed, the mucous membrane is seen to be deep red, cedematous, and more or less excoriated and covered with copious creamy greenish pus mixed with glairy mucus. In most cases there is coexistent inflammation of the os uteri in the form of a deep-red, easily-bleeding, inflammatory areola, and from it a muco-purulent plug may hang. In some cases the gonorrhœal inflammation extends only as far as the os internum, but in others the uterine cavity is affected.

Besides the cases of gonorrhœa of the vagina which, from the sudden onset of the affection and from its violent nature, are regarded as due to direct contagion, we frequently see vaginitis—or, as it is of late years termed, elytritis—develop in persons subject to cervical and corporeal endometritis and chronic subacute inflammation of the vagina. The history of the beginning of the trouble is usually very vague, though in some cases excessive and unnatural coitus and uncleanness seem to be the exciting causes. Morbid constitutional conditions may tend to intensify this inflammation.

Vaginitis or elytritis of more or less severity occurs in the young, middle-aged, and old in less severe form than that already described. This variety is termed by authors simple vaginitis, and Martineau says that it can be differentiated from the severe forms by the fact that in the latter the secretion is acid in reaction, while in the former it is alkaline. The clinical description of the severe form has been given, and it is only necessary to say that in every feature the mild affection is much less severe. In these mild cases, however, exacerbations may be observed, and the affection may become as severe as those of gonorrhœal origin.

Verchère<sup>1</sup> describes a rare form of diphtheroid or croupal vaginitis which he observed in two cases of young girls suffering from acute gonorrhœa. The vaginal mucous membrane was red and swollen, and scattered over it in small and large areas were yellowish-white patches of false membrane which were very adherent to the vagina. They showed a decided tendency to reappear after removal. The mucous membrane under these plaques gave the appearance of hospital gangrene. There was an abundant flow of pus of bad odor, and the parts were the seat of heat and pain. In spite of an energetic treatment, the affection, which was strictly limited to the vagina, lasted about three weeks.

As a result of gonorrhœal vaginitis, the mucous membrane is sometimes found to be thickened and granular. These granulations are due to exuberant epithelial proliferation and new vessel-formation, and may be scattered over the whole tube, or may be localized particularly in its posterior wall.

Some observers, notably gynecologists, claim that simple vegetations or warts are symptomatic of gonorrhœal inflammation. This statement is incorrect and misleading. Vegetations result from any chronic irritative process by which the parts are kept hot and moist. They are frequently seen in women who never had connection and were uncleanly. They may occur during the course of any catarrhal process of the vagina or vulva, and may develop in the course of gonorrhœa.

In the study of gonorrhœa in the female we must not allow ourselves

<sup>1</sup> *Op. cit.*, vol. i. pp. 82 et seq.



to be fettered with too sharply-drawn laws based on the infallibility of the gonococcus,<sup>1</sup> since at almost every step we find that clinical facts are at variance with microscopical deductions, or at least not in direct conformity with them. It is these considerations, which have for years been forcing themselves on my mind, which cause me to give myself more latitude in describing gonorrhœal vaginitis than the followers of Neisser are willing to accord to themselves and to others.

As an instance of the susceptibility of the vagina the following striking case, reported by Welander,<sup>2</sup> is of great interest: A man having gonorrhœa attempted coitus, without successful intromission, during two days with his newly-married wife. Violent inflammation of the vulva, urethra, and introitus vaginae was soon set up. In the profuse purulent secretion many gonococci were found. The infection travelled upward and involved the vagina, but not the cervix uteri. Hardy, quoted by Verchère,<sup>3</sup> also reported an interesting case. It was that of a young girl who, having no trouble previously, had a single and only connection with a man. A few days later there was a purulent discharge from the cervix uteri, which ran down and infected the vagina. The whole morbid process was carefully watched by Hardy.

<sup>1</sup> Conrad of Berne (*British Med. Journal*, Oct. 17, 1887, p. 854) has tried to solve the question as to whether it is possible to differentiate a gonorrhœal affection of the female genitals from a non-gonorrhœal one by means of the microscopic examination of secretions and cultivation-experiments. He gathered with much care and at different times the secretions of acute purulent and mucoid catarrh of the vagina, womb, and urethra from cases which had from time to time recurred with exacerbations, and submitted them to bacterioscopic examinations with the assistance of three experienced bacteriologists. Sixty cases of supposed gonorrhœa were thus studied, and only in five recent and two chronic cases was the gonococcus found, though numerous bacilli and cocci were seen. Conrad reaches the following conclusions: 1. The detection of the gonococcus succeeds more easily in men than in women. It is so because the latter (a) experience comparatively less discomfort from acute gonorrhœa where the microbe is most frequently demonstrated; (b) they generally seek medical advice and help later than men; (c) as a rule, they pass water before undergoing a gynecological examination, and thus wash away or dilute their urethral discharge; (d) they sometimes come to be examined only after treatment by injections or other local means. It is possible also that detection becomes more difficult in consequence of gonococci being destroyed by micro-organisms of other species, which often grow luxuriantly in discharges of genital mucous membranes. 2. While in recent cases of female gonorrhœa Neisser's gonococcus may be almost always detected, it cannot possibly be found in many chronic cases. 3. Hence both acute and chronic gonorrhœal affections may be present in women in spite of our inability to demonstrate the pathogenic microbe in a given case. If so, the gonococcus may have merely a limited diagnostic value, the practitioner being often compelled to rely on etiological and clinical facts. Emmert, a colleague of Conrad, drew attention to the fact that the genuine habitat of the gonococcus appeared to be the discharge of the urethra, and not of the vagina, since, when the microbe was found in the former, artificial inoculation of the vaginal mucous membrane almost invariably produced gonorrhœal vaginitis, while inoculation of the vaginal discharge from a gonorrhœal woman in the vagina of a healthy one had no effect.

Sahli, another of Conrad's colleagues, also thought that the gonococcus very often could not be demonstrated in the gonorrhœal pus of women, and states that he was unable to detect it in a patient with a profuse purulent vaginal discharge who had recently been infected by a man with typical gonorrhœa and with masses of cocci in his urethral discharge. Only some extracellular diplococci were discovered in the woman. Sahli ascribes the difficulties in finding the gonococci in the female to the possibility of their being crowded out by other vaginal micro-organisms of non-pathogenic and half-pathogenic varieties; by which he means microbes which give rise to pathological processes only when they are present in considerable numbers or when the system is already weakened by any cause.

<sup>2</sup> "Gibt es eine Vaginitis gonorrhœica bei erwachsenen Frauen?" *Archiv für Derm. und Syph.*, 1892, pp. 78 et seq.

<sup>3</sup> *Op. cit.*

Gonorrhœa of the vagina, therefore, may be caused by the extension upward of the infection from the vulva, and it may also result from infection by virulent pus from the cervix uteri. True gonorrhœa, limited to the vagina proper, may be seen rather exceptionally in quite young women.

### Gonorrhœa of the Vulva.

Gonorrhœa may originate primarily in the vulva, or it may be caused by contact with gonorrhœal pus from the vagina and parts above. As a primary affection it is not very common, and is usually seen in young girls of from fifteen to twenty years of age as a result of rape or coitus which is difficult of accomplishment, owing to the then compact and unstretched condition of the parts. It is this natural impediment to intromission which causes the external infection by the gonorrhœal pus from men.

Gonorrhœa of the vulva begins with a sensation of itching, soon followed by intense burning. At first the secretion is mucoid and in excess of the normal fluid of the parts; it then becomes muco-purulent, and finally of a glairy, purulent character. Examination usually shows, particularly in hospitals and dispensaries, and often in private practice, matting of the hairs on the mons Veneris and of the hairs of the labia majora in the form of little tufts. Upon separation the greater and lesser labia are seen to be very red, much swollen, with more or less superficially eroded areas, and in the reflections of the mucous membrane. The whole surface is bathed with a creamy pus which stains and stiffens the drawers and back portion of the chemise in spots. Perhaps there may be erythematous or even eczematous patches on the upper and inner coapted surfaces of the thighs from the irritation of the discharge which has flowed over them, and which may even severely irritate the anus. In uncleanly subjects the retention and decomposition of the discharge give rise to a characteristic nauseating and disgusting odor. When the inflamed surfaces have been carefully bathed, numerous minute follicular elevations, many perhaps superficially eroded, may be seen, mostly on the labia minora, but also on the labia majora. Unless appropriate treatment is instituted, the swelling becomes very great, the eroded surfaces become larger and coalesce, and in consequence of the swollen condition examination of the urethra and vulva is very difficult and painful. In cases of long labia minora the swelling is sometimes so great, and the constriction offered by the labia majora is so firm, that strangulation seems imminent. This condition has been considered by some authors as analogous to paraphimosis in the male, while others think that acute vulvitis is the analogue of balanitis and balanoposthitis. The inflammatory process may be thus intense, and yet limited to the vulva; and, although the urethral and vaginal orifices are red and inflamed, these canals may yet remain unaffected. Thus it is that urination is excruciatingly painful, particularly when the urine runs over the vestibule, vaginal orifice, and fourchette, and that digital or instrumental examination is rendered impossible.

Taking all its features into consideration, gonorrhœa of the vulva of the severe form is a distressingly painful affection. Its heat, attendant itching, and burning give rise to erotic desires, even to nymphomania,

while handling or manipulation of the parts or sexual intercourse is utterly impossible. Not uncommonly, the irritation of the anal orifice by the escaping discharge gives rise to tenesmus, diarrhœa, and even incontinence of the rectum. Such patients are frequently forced to assume the recumbent position, since sitting and walking are attended by increased pain. Occasionally malaise with mild fever is noticed.

Arising as it does from aborted and perhaps violent attempts at coitus in rape, in mediate contagion from gonorrhœal pus, the date of the onset of vulvar gonorrhœa is very often clearly marked. The evolution of the affection is prompt and rapid, and but one or two days may elapse from the time of the commencement of the premonitory pruritic burning sensation to its full development. The course is entirely dependent upon the efficiency and vigor of treatment. In dispensary practice it is often very difficult to make these girls give themselves proper care. Hence this affection in the lower classes often runs on into a chronic condition. In many of these cases the inflammation settles itself in the cleft between the large and small labia and around the introitus vaginæ. In private practice patients are more attentive to treatment, and then the severity of the trouble subsides in about a week or ten days. Becoming sub-acute, it then may rapidly subside and disappear.

In acute gonorrhœa of the vulva there is frequently invasion of the urethra, and in some cases the infection extends into the vagina. Not uncommonly Bartholin's glands are attacked, and rather less frequently Skene's glands and the periurethral glands may become implicated. These complications naturally prolong the course of the inflammation.

There is a chronic form of vulvitis, which consists in an inflammation of the sebaceous and mucous follicles, which may or may not be of gonorrhœal origin. Examination of the parts shows a large or small number of minute red follicular elevations seated on the inner surface of the labia majora and minora. This is the "sebaceous" or follicular vulvitis described by Huguier.<sup>1</sup> If properly treated, it is an ephemeral affection.

The vulvo-vaginitis of children is described in the following chapter.

## Inflammation of the Periurethral and Para-urethral Follicles and Glands.

### INFLAMMATION OF SKENE'S URETHRAL GLANDS.

Skene's glands, which open a little within the orifice of the urethra, may be the seat of a mild form of inflammation which causes the patient very little discomfort. The orifices are seen to be enlarged, and around them is a thin rim of redness. A more severe condition is sometimes seen in which there is active inflammation of the ducts and the surrounding tissues and the escape of a purulent fluid. In this condition the meatus is so swollen that it is somewhat prolapsed and everted, and thus it happens that the orifices of the ducts are rendered visible and look like little yellowish-gray ulcers seated on a deep-red papillomatous base. Skene<sup>2</sup> says that the appearance of the parts resembles caruncle or papilloma, and he records a case under his own care in which the diag-

<sup>1</sup> *Mémoires de l'Académie de Méd.*, 1850, p. 529.

<sup>2</sup> *Op. cit.*



nosis was not made for many months. The patient suffered from pain on sitting and walking, and was debarred from sexual intercourse. A probe could be passed into the orifices of the glands for more than half an inch, and on withdrawal and by downward pressure on the urethra pus escaped. This patient under a false diagnosis was treated twenty-one months with no relief, but was promptly cured in two months after a correct diagnosis had been made.

These glands may be affected during and after acute gonorrhœal inflammation. This affection, however, is not of frequent occurrence.

#### GONORRHŒAL FOLLICULITIS.

Around the urethra for a distance of a third or half of an inch a number of small follicles open by means of very minute ducts. These follicles may become inflamed during acute or chronic gonorrhœa and in women with simple vaginal discharges. These little foci of inflammation, of which there may be as few as two and as many as ten, called by French authors *folliculite blennorrhagique*, are very apt to escape observation, for the reason that they do not present a striking appearance. They simply look like inflamed pinhead-sized elevations, on which perhaps there may be a small pus crust. They cause the patient very little trouble beyond a very slight sensation of heat and pricking. Pressure on the parts will usually cause a small quantity of pus to exude. Then a very fine probe may be inserted into the orifice thus revealed for a quarter of an inch or even deeper. Unless properly treated, these periurethral folliculites of women may persist indefinitely. Martineau is the only author who claims the frequency of occurrence of these lesions.

Under the title *urétrite externe* Guérin<sup>1</sup> described a gonorrhœal process involving two goodly-sized glands, to-day known as the vestibulo-vaginal bulbs, the orifices of which open on each side of the meatus, and perhaps a little distance from it, but on its lower border near the vagina. This affection rapidly passes from the acute to the chronic stage, in which it may linger for long periods. This variety of gonorrhœa in women is considered by Guérin, owing to its chronicity, analogous to the *goutte militaire* of men. On examination we find a red elevation, which may be covered with pus or from which on pressure a little pus may exude. This lesion may escape detection unless very scrutinizing search is made for it. Women frequently, before coming to the surgeon, wash the parts or in urination the secretion is carried away. When by careful pressure the orifice of the gland is detected, the passage of a fine probe to the depth of half an inch or more will show the source from which the suppuration comes. It can readily be understood that such a chronic lesion might be a persistent source of infection in men, since it is not uncommon for it to undergo exacerbations.

These glands may rather rarely become the seat of abscess. Göbel<sup>2</sup> reports the case of a young girl suffering with gonorrhœa who had a painful abscess of the size of a pigeon's egg which bulged into the vaginal canal. The microscopical examination of the pus evacuated by incision

<sup>1</sup> *Maladies des Organes génitaux externes de la Femme*, Paris, 1864, p. 307.

<sup>2</sup> "Gonorrhöische urethritis beim Weibe mit Periurethralem Abscess," *Inaug. Dissert.*, Erlangen, 1889.

was negative. Cory<sup>1</sup> also reports a similar case, in which the history of gonorrhœa is not clear, but in which there was much local inflammation, together with severe febrile symptoms.

Inflammation of these glands may be cured by treatment, but it may result in sinuses and fistulæ. Lormand<sup>2</sup> reports an interesting case. It was that of a young woman suffering from gonorrhœa who had a swelling of the size of a small nut to the left of the urethral orifice. Pressure on the swelling caused pus to exude from the meatus, and when a solution of permanganate of potassa was injected into its ducts, then fluid ran from the meatus. A probe passed into the fistula could be felt in the urethra.

Harmonic<sup>3</sup> also reports a case in which to the right and a little below the meatus was a small red warty or papillomatous elevation through which a fine probe could be passed into the urethra. In this case lancinating pains in the vulva were complained of.

#### PARA-URETHRAL FOLLICULITIS.

Scattered over the vestibule, at a distance of half an inch or a little more from the meatus (according to the natural size of the parts), is a number of mucous follicles which may be affected by gonorrhœa of the urethra, vulva, and vagina. These follicles, when inflamed, look like small red papillæ, from which, upon pressure, a little muco-pus or pus will exude. Unless cured, these lesions may remain in a chronic and indolent condition, and they may end in sinuses or in true fistulæ. These fistulæ may end in the urethra near the meatus or farther down the urethral canal. They also may extend toward the vagina in an incomplete form, or they may open into that tube. On this subject Martineau's<sup>4</sup> brochure may be consulted.

Around the fourchette and near the posterior wall of the vagina a number of mucous follicles are seated, and they are sometimes invaded by the gonorrhœal process. These lesions look like small red swellings, from which, on pressure, a little pus may exude. These follicular inflammations are very chronic in character and rebellious to treatment. They may result in sinuses and fistulæ. In some cases the sinus or fistula extends toward the vagina, and in others toward the rectum. As a result, therefore, there may be vulvo-vaginal or vulvo-rectal fistulæ. These fistulæ are usually very small, they cause little trouble during long periods of time, and frequently they pass unrecognized for years.

Many cases of genital folliculitis in women will be met in which absolutely no history of gonorrhœa can be obtained.

#### INFLAMMATION OF BARTHOLIN'S GLANDS.

Bartholin's or the vulvo-vaginal glands are situated one on either side of the entrance to the vagina, in the triangular space bounded by

<sup>1</sup> "Abscess of the Female Urethra," *Transact. of Obstet. Society of London*, 1870, vol. xi. pp. 65 et seq.

<sup>2</sup> "Note sur un Cas de Fistule vestibulo-urétrale d'Origine blennorrhagique," *La France médicale*, Sept. 27, 1883, pp. 433 et seq.

<sup>3</sup> "Fistule vestibulo-urétrale consecutive à une Folliculite blennorrhagique pré-urethrale," *Annales de Derm. et de Syph.*, 1884, pp. 344 et seq.

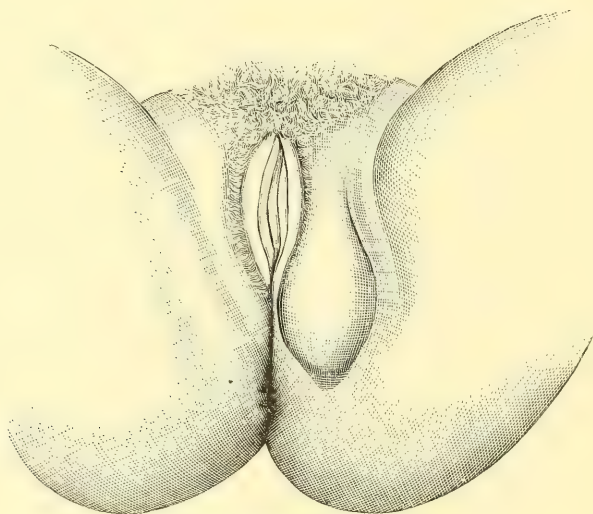
<sup>4</sup> *Op. cit.*, pp. 61 et seq.

the ascending ramus of the ischium, the vaginal orifice, and the transversus perinaei muscle, and are covered by the superficial perineal fascia and some fibres of the constrictor vaginæ. They are conglomerate glands, having, when fully developed, a diameter of six-tenths of an inch. The ducts of these glands are about six lines in length, and they open just in front of the hymen near the lateral and posterior carunculæ myrtiformes. These glands pour out in coitus and in genital excitation a copious secretion of albuminous fluid, which lubricates the vulva and the vagina. The vulvo-vaginal glands may be the seat of two forms of inflammation, the one simple, and the other gonorrhœal.

Simple acute Bartholinitis is mostly seen in young girls, married or single, and generally follows early efforts at coitus. In many cases it results from the violence attendant upon rape. In some cases the simple rupture of the hymen causes local irritation, and as a result one or both vulvo-vaginal glands become inflamed. Its frequency in very young married women has caused it to be called "the bride's abscess." It is particularly liable to develop in girls who have leucorrhœa and who are not careful as to the cleanliness of the genital parts. It sometimes results from excessive coitus and also from masturbation.

The **symptoms** are usually quite strongly marked. The patient complains of pain or soreness in the vulva, and inspection reveals a small

FIG. 89.



Abscess of vulvo-vaginal gland.

rounded swelling at the lower or posterior third of the vaginal orifice. This swelling rapidly increases until it may reach the size of a quite small egg. Then the labium major becomes pear-shaped and is pushed outward, and we see a deep-red, rounded, fluctuating swelling, which may extend an inch and even more from the level of the vaginal orifice. The parts are the seat of throbbing, dragging pain, and are exquisitely sensitive to the touch. In this condition, in severe cases, the patients can neither walk, stand, nor sit. They have chills, malaise,



and febrile movement. In some cases there is spontaneous rupture through the duct, but in most cases it is necessary to incise the abscess. Sometimes it bursts spontaneously, most commonly near the glandular outlet, and rarely over the convexity of the tumor. The pus is usually thick and yellow, but it may be thin and serous. Exceptionally, it has a fetid odor. In most cases, after incision into or bursting of the abscess, the parts heal and the gland seems to return to its natural condition.

In several cases I have observed that the abscess was periglandular, and that the suppuration left the gland itself and developed itself in the connective tissue outside of it. This condition is the same as that which we sometimes observe in abscess of follicles of the male urethra. With the discharge of the pus the gland promptly becomes normal and the surrounding inflammation ceases. In many cases, however, after abscess-formation and pus-extrusion have taken place, the gland seemingly returns to its normal state, yet exacerbations and relapses are liable to occur. Thus, after menstruation the gland may swell and become painful, and in this condition it may remain a little time, and then subside. Such exacerbations as these may be very frequent, and they keep the patients in a continuous state of dread. Excessive venery, masturbation, and leucorrhœal discharges may also light up the suppurative process, with all its local and general disturbances. As the interval of time between exacerbations becomes longer the tendency to them seems to lessen, and generally it dies out. But it is not uncommon to see a woman suffer from acute Bartholinitis several years after her first, second, or third experience.

In most cases of simple acute Bartholinitis the parts heal and appear normal. In some cases a sinus is left, and in very exceptional cases a vulvo- or vagino-rectal fistula is formed.

Usually but one gland is affected, and most commonly it is the left one. The affection may, however, occur bilaterally. In all probability the simple form of Bartholinitis is caused by pus-cocci acting upon a bruised or hyperæmic part thus rendered susceptible to infection.

During the course of gonorrhœa, acute or chronic, the ducts of Bartholin's glands, or the glands themselves, may be the seat of a suppurating inflammation. Of late years there has been a tendency to magnify the frequency of occurrence of these complications of gonorrhœa in women. In acute gonorrhœa the duct and the gland itself are sometimes the seat of inflammation. In chronic gonorrhœa it is more common to find only the duct or the ducts involved.

Gonorrhœal inflammation of the duct of the vulvo-vaginal glands may be attended with very mild symptoms of heat and pricking, and these may be wholly absent. On inspection we find the opening of these ducts red and a little swollen; the red spots thus produced are called by Sânger "*maculæ gonorrhœica*." Pressure on the parts against the ramus of the ischium causes a drop of milky or greenish pus to exude. In some cases this localized inflammation is the only remnant of the gonorrhœal process. It causes little or no discomfort, so that frequently the patient does not know that she has such a trouble. In this indolent condition it may remain for long periods, or it may, as a result of exciting and irritating causes, become acute. The body of the gland may become infected, in which event there may be an

acute suppuration, but usually the condition is rather indolent and sub-acute. The gland swells to the size of a nutmeg or walnut, and may be grasped and its contour clearly made out between the finger-tips. The swelling presents a smooth, quite firm structure of roundish or oval outline. Not infrequently the duct of the gland can be felt like a firm round cord. Pressure causes a whitish pus to exude. This condition of affairs is found in prostitutes, particularly in old ones. It is the cause of much trouble and worry to them, since they are always in dread of a recrudescence of the acute inflammation, which may result from sexual excess or any inflammation about the genitals or in the pelvic cavity. Very exceptionally I have seen chronic gonorrhœal inflammation of Bartholin's glands take on the characters of a simple acute affection, develop into an abscess, and burst. The usual tendency is for the glands to become hard and swollen, and to remain uninfluenced by any treatment, except surgical.

The infectiousness of the pus of specific Bartholinitis is now generally conceded. In 1877, prior to the era of the gonococcus, Le Pileur<sup>1</sup> traced an acute gonorrhœa of a medical friend to the pus of a discharging vulvo-vaginal gland, there being absolutely no other seat of gonorrhœal infection in the woman with whom the medical man had cohabited.

Owing to the mild chronicity of the morbid process and to the hidden condition of the orifice of the duct, gonorrhœal Bartholinitis may very readily escape recognition unless carefully looked for. Women coming for examination and public prostitutes become aware of this focus of inflammation in their genitals, and take pains to deceive the examining physician. They squeeze out the contents of the glands and wash and syringe their genitals, thus frequently removing for a time all traces of the inflammation. This point must be borne in mind when examining women under suspicion of having gonorrhœa. They must be compelled to present themselves without any preliminary preparation.

Arning<sup>2</sup> placed gonorrhœal vulvo-vaginitis on a scientific basis when he clearly demonstrated the presence of the gonococcus in the pus of seven inflamed vulvo-vaginal glands.

Touton<sup>3</sup> has recently submitted an excised vulvo-vaginal gland and its duct to an elaborate and interesting microscopical examination and study, and has clearly shown that the micro-organism attacks the pavement epithelium of the duct and produces typical inflammation, and by extension attacks the gland itself.

**Gonorrhœa of the Tubes, Ovaries, and Peritoneum.**—When gonorrhœa ascends and passes from the uterus to the tubes and beyond, the case then enters the domain of the gynecologist. I shall not attempt to give a detailed description of the pelvic troubles in women caused by gonorrhœa, but shall confine myself to a general consideration of the subject, leaving it to the reader to fully inform himself from the various works on gynecology.

We have already seen that there is at present a tendency to exaggerate

<sup>1</sup> "Blennorrhagie uréthrale ayant pour origine l'inoculation de Pus d'une Glande de Bartholin abcédée, etc.," *Annales de Derm. et de Syph.*, vol. ix., 1878, pp. 374 et seq.

<sup>2</sup> "Ueber das Vorkommen von Gonococcen bei Bartholinitis," *Vierteljahresschr. für Derm. und Syph.*, 1883, pp. 371 et seq.

<sup>3</sup> "Die Gonococcen im Gewebe der Bartholini'schen Drüse," *Archiv für Derm. und Syph.*, 1893, pp. 181 et seq.

the frequency of gonorrhœal pelvic disease and to make such a diagnosis off-hand on very insufficient data. That the tissues around the uterus, the tubes, the ovaries, and peritoneum may be attacked by the gonorrhœal process is undeniably true, but it does not occur in the majority of cases. In reporting cases it is necessary first to establish the facts of a gonorrhœal infection beginning in some part, such as the urethra, vulva, uterine neck, and vagina, and if possible to find out from whom the infection was derived. Then the symptoms and course of the disease must be such as will accord with the clinical history of gonorrhœa. Then it is necessary to establish the fact that the cervix uteri has been infected primarily or secondarily, and, if this is done, there can be no doubt whatever as to the gonorrhœal origin of any pyosalpinx, oöphoritis, perimetritis, and peritonitis. These requirements may be difficult of fulfilment, but accurate knowledge of the subject can only be obtained as a result of painstaking observation and examination, which will generally warrant a correct diagnosis. There is no such thing as a latent gonorrhœa without well-defined pathological conditions. Gonorrhœa may lurk in a latent or dormant condition in some part of the genito-urinary tract of the woman, but it is always a well-defined pathological process, and it may be clearly established if we take the pains to search for it clinically and microscopically.

v. Rosthorn<sup>1</sup> gives a very clear general clinical history of a case of severe gonorrhœal infection in a woman. "Having been infected by her husband, a previously healthy woman shortly after marriage begins to feel poorly and becomes tired easily. Menstruation becomes profuse, and there is dysmenorrhœa and leucorrhœa. She has severe colicky pains resembling those of labor, and constant pains in the groins and back, which interfere with locomotion and the pleasures of life. She has mental depression, and even may become melancholy. Suddenly an acute attack of peritonitis<sup>2</sup> comes on, from which she partly recovers, and can walk around, but is forced to avoid all exertion, and particularly jolting in cars or carriages. Coitus may bring on another attack. Indeed, throughout her life, until after the menopause, she is liable to relapses from slight causes. The uterus is enlarged and tender. The tubes are dilated to the size of a finger or a sausage, and the ovaries are enlarged, suppurating, and perhaps cystic, covered with inflammatory products, and perhaps displaced and bound down by adhesions in Douglas's cul-de-sac. The peritoneum is thickened, hyperæmic, and produces displacements of the uterus. Sterility is observed in the majority of these cases."

In some cases it is very difficult, and even impossible, to get a clear consecutive history of gonorrhœal inflammation and invasion, and in these the microscope may or may not be of assistance. In the examination of

<sup>1</sup> "Ueber die Folgen der Gonorrhœischen Infection bei der Frau," *Prag. med. Wochenschr.*, vol. xvii., 1892, Nos. 2 and 3.

<sup>2</sup> The usual mode of invasion of pelvic organs of the female by gonorrhœa is slow and insidious, sometimes developing suddenly into an acute condition. In a case, however, reported by Penrose ("Acute Peritonitis from Gonorrhœa," *Med. News*, July 5, 1890, pp. 16 and 17), only six days elapsed between the sexual act in man and wife and the development in the latter of an intense and threatening peritonitis which required operative relief. The peritoneum was characteristically inflamed and the tubes were the seat of an exudative purulent inflammation. The husband at the time suffered from very severe gonorrhœa with epididymitis. The microbes found in the tubal pus had the appearance of some of the staphylococci of suppuration.



pus from the uterus and tubes the finding of the gonococcus is not at all frequent or constant, and the supposition is warranted that other micro-organisms take part in the morbid process.

Bumm<sup>1</sup> has advanced the theory of mixed or compound infections in women. Reasoning on the hypothesis that the bacteria of pneumonia destroy the epithelial lining of the pulmonary alveoli, and cause an exudation which forms a cultivating medium for the bacillus tuberculosis and pyogenic micro-organisms which result in phthisis and abscess of the lungs, he thinks that the gonococcus likewise acts upon the female genital mucous membranes, and produces a suitable culture-ground for other organisms which do not attack them in the healthy state. Bumm is convinced that the gonococcus only involves mucous membranes, and that for this reason women suffering from gonorrhœa are not attacked by pelvic cellulitis. The latter, he thinks, is due to compound infection, since in two cases of the trouble complicated by abscess he found large quantities of the staphylococcus aureus in the pus. He thinks that the micro-organisms penetrated the erosions in the cervix, and were carried by the lymphatics into the connective tissue of the pelvis.

Bumm also states that the further the inflammation extends from the vagina, the less are the chances for compound infection, and that in gonorrhœa of the uterus there are usually few germs besides the gonococcus, and that in the tubes the latter alone is usually found. In the tubes the specific action of this microbe may be seen in the form of purulent inflammation of the mucous membrane only, the connective tissue not being invaded. He is under the impression that the escape of gonorrhœal pus from the tubes into the peritoneal cavity is not followed by suppurative peritonitis, but that a circumscribed adhesive inflammation is set up which seals up the tube, and that the woman may suffer afterward from chronic pyosalpinx. Should pyogenic micrococci be present in the pus, Bumm thinks that purulent peritonitis and death might ensue. As in man gonorrhœal epididymitis may be followed by tuberculosis of the organ, so in the woman, according to Bumm, may the tubes the seat of gonorrhœa be attacked by tuberculosis, both cases being instances of "mixed gonorrhœal infections."

Later observations by Wertheim<sup>2</sup> have shown that Bumm too narrowly restricts the pathological action of the gonococcus. Wertheim clearly shows that the gonococcus can invade the connective tissues like ordinary pus-microbes. Thus, he shows that the deeper inflammations, other than those of the mucous membrane, in the female may be caused by the gonococcus, such as parametric infiltrations, perimetritic exudations, and plastic adhesions and inflammatory changes in the ovaries. Wertheim shows that the gonococcus can penetrate the walls of the tubes into the peritoneum, and there produce inflammation. Peritonitis is also caused by the escape of gonorrhœal pus through the tubal orifices into the peritoneum. The tendency of peritonitis produced by the gonococcus is to be-

<sup>1</sup> "Ueber Gonorrhœische Mischinfectionen beim Weibe," *Deutsche med. Wochenschrift*, Dec. 8, 1887, pp. 1057 et seq.

<sup>2</sup> *Op. cit.* In Wertheim's two essays the bibliography of the observations (all foreign) of the gonococcus in the tubes is given. In this country Dr. Howard A. Kelly ("The Gonococcus in Pyosalpinx," *The Johns Hopkins Hospital Reports*, vol. ii., Nos. 3 and 4, 1890) reports finding a diplococcus characteristically grouped within the pus-cells from the tube least affected in a case of double pyosalpinx.

come walled in by adhesions and to run a less severe and prolonged course than other forms.

From what has already been published it seems conclusive that the gonococcus may in some cases live and thrive in the tubes, and from these invade the neighboring parts. It also seems clear that in some cases the microbes die in the tubal pus, perhaps, as is claimed, as a result of the poisons they secrete. There can be no doubt of the presence of the pyogenic micro-organisms in the majority of cases of tubal disease. Wertheim's observations certainly restrict the scope of Bumm's mixed-infection theory, but they do not absolutely invalidate it, since he has not by any means proved that the gonococcus is uniformly found in the pus of tubes the seat of gonorrhœal inflammation. This subject needs further elucidation and elaboration.

**Prophylaxis.**—The question of the prevention of gonorrhœa in women is one of great gravity, and should attract more attention than it does, particularly in this country. Much can be done by physicians in lessening the number of cases of gonorrhœa in men by impressing on kept-women and prostitutes, who so numerous come under our care, the necessity of absolute cleanliness and of the use of antiseptic (bichloride) injections and douches. While we can hardly agree with Broese,<sup>1</sup> who says that "one can scarcely err if he assumes that all prostitutes are infected with gonorrhœa, especially if they have exercised their profession for any length of time," we can look upon them as a dangerous class, and should treat them as such. There being no registration of prostitutes in this country, the physician's influence over them is very limited. When, however, they do come under medical care in hospitals, dispensaries, and in private practice, we should endeavor to follow as far as we can the requirements laid down by Sanger and v. Rosthorn, which, though some of them are impracticable with us, are deserving of being emphasized. They are—1. A careful watch over registered prostitutes and relentless efforts directed against the unregistered class. (We can do nothing in this direction.) 2. Prolonged treatment of infected prostitutes by physicians having special training. 3. The compulsory use of bichloride douches for the vagina and vulva. Care should be taken by the physicians to teach these women how to use these douches effectively. 4. Have the male wash the penis with bichloride solution after each coitus. 5. Rational and prolonged treatment of men having the disease, and forbidding marriage until the gonorrhœa is cured.

Broese lays great stress on the danger of reinfection of the wife, after having been cured of one attack of gonorrhœa, by her husband, in whom the disease remains in an infectious condition. This is a very important subject. The surgeon, having satisfied himself that the woman has gonorrhœa, has the double duty on his hands of curing the woman and of seeing to it that she is not again infected. To this end he must consult the husband (using all tact and prudence) and impress upon him the necessity of being absolutely cured of his trouble. Much good can be done in hospitals and maternity institutions by the examination of the secretions of the genitals of pregnant women, and by instituting an intelligent and vigorous treatment which will benefit the woman and perhaps prevent the gonorrhœal infection of the eyes of her infant when it arrives.

<sup>1</sup> "Zur Aetiologie Diagnose, und Therapie der Weiblichen Gonorrhoe," *Deut. med. Wochenschr.*, 1892, pp. 370, 398, and 419.

**Treatment of Gonorrhœa in the Female.**—In the treatment of gonorrhœa in the female the prime essentials are scrupulous cleanliness, copious antiseptic injections and flushings, and constant care as to details. The patient should be made to clearly understand the gravity of the disease and its tendency to further upward extension and to localize itself in the recesses and crypts of the genitalia; and she should be urged to continue under observation until she is pronounced cured by the surgeon. It is the duty of the latter to make thorough and painstaking examinations of the whole genito-urinary tract, and to acquaint himself with the full extent of the disease. The various morbid secretions should be examined by means of the microscope with a high-power lens and oil-immersion.

In acute cases the recumbent position should be insisted upon. The diet should be of the simplest character, and preferably of milk. A brisk cathartic may be given, and throughout the course of the disease one or more full movements of the bowels should occur each day.

For the purpose of lucidity of description and orderly arrangement the treatment of gonorrhœa will be given on the lines of the anatomical situation of the parts and regions involved, rather than on the clinical basis and the relative frequency of the various forms of gonorrhœa in the female.

For gonorrhœa of the vulva, with all its painful accompaniments in the acute stage, very hot sitz-baths, repeated four or more times daily if possible, should be used, taking care that the water is brought into free contact with the whole surface affected. Very often the itching and burning are much allayed by affusions of hot alkaline solutions (powdered borax or supercarbonate of soda,  $\mathfrak{z}\text{ij}$  to water  $\mathfrak{z}\text{xxxij}$ ), to which may be added two to four drachms of wine of opium or laudanum. Then a lotion as follows may be employed:

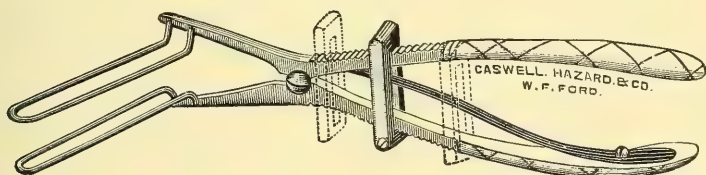
R. Pulv. boracis,	$\mathfrak{z}\text{j}$ ;
Liq. plumbi subacetatis,	$\mathfrak{z}\text{iss}$ ;
Ext. opii aquos,	$\mathfrak{z}\text{j}$ ;
Aque,	$\mathfrak{z}\text{vj}$ .—M.

With this may be saturated pledgets of lint or of absorbent gauze, which should be carefully and thoroughly applied to the surfaces in order to keep them apart, and renewed very frequently, since they soon become saturated with pus. So soon as the vulvar orifice will permit a soft catheter, No. 15 F., or the long tube of a Davidson's or fountain syringe, should be introduced as far as it will go, and several copious injections of very hot alkaline water should be made every day. As the inflammation declines it may be necessary to paint the parts to their smallest recesses with a solution of nitrate of silver, thirty grains to the ounce of water, followed by hot ablutions with a solution of common salt. After a very hot sitz-bath the lead-opium-and-borax lotion may again be applied. In twenty-four hours after this application to the old or the young much improvement will be noted in the lessened œdema and redness and in a less painful condition. Then a 1 per cent. solution of alum, with laudanum, may be used, and later on the parts may be dusted with subnitrate of bismuth or powdered boracic acid on a pledget of lint or absorbent gauze.



GONORRHŒA OF THE URETHRA.—Vulvar gonorrhœa is very frequently, sooner or later, accompanied with implication of the urethra and increase in the patient's sufferings. The solution of bicarbonate of potassa with hyoscyamus recommended for acute gonorrhœa of the male may be given in order to relieve the urine of its acidity, and diluent drinks, such as flaxseed and slippery-elm teas and barley-water, may be taken *ad libitum*. As soon as the inflammation in the urethra has somewhat subsided by use of the foregoing measures suitable for the acute stage of vulvitis, intra-urethral injections of very hot water with borax or boracic acid,  $\text{ʒij}$  to  $\text{ʒxxxij}$ , frequently made by means of any recurrent syringe or catheter, or preferably by means of Skene's reflux catheter, may be used. As the inflammation subsides, intra-urethral injections of hot water, containing carbolic acid in the proportion of  $\frac{1}{2}$  of 1 per cent., are very beneficial. In many instances where the pain on urination is very great the instillation into the urethra by means of a small cylindrical dropping-pipe of a solution of opium in glycerin, or of cocaine muriate in glycerin and water, is followed by marked relief. As the urethral lesion further declines, a 2 per cent. solution of nitrate of silver may be injected as far down the urethra as possible, since it is commonly involved in its whole length; or a thirty-grain-to-the-ounce solution of nitrate of silver may be carefully and sparingly applied by

FIG. 90.



Sims's urethral forceps.

means of a cotton-holder, facilitated either by the endoscope or by the fenestrated forceps of Dr. H. M. Sims.

An essentially antiseptic treatment is used at the Antiquaille Hospital by Rollet.<sup>1</sup> A catheter like that of Mitchell's reflux form is introduced into the urethra as far as its vesical neck; then the canal is irrigated with solutions of sublimate, 1 : 2000, or permanganate of potassa, 1 : 250. An antiseptic pencil (see Medicated Bougies, p. 152) may be inserted into the urethra, which is washed with a solution of resorcin, 1 : 10 or 30. Antiseptic irrigations of the vagina are used to prevent the ascent of the disease.

Vigneron,<sup>2</sup> in Chéron's service, used injections of a saturated solution of picric acid. The urethra was first irrigated with boric-acid water, and then by means of a uterine syringe ten cubic centimetres of the solution were thrown into the bladder. The vulva was carefully cleansed. A cure is said to follow a few injections in from ten to twenty days.

It is only in the subacute and chronic stages that antiblennorrhagics are to be used, and then in rather smaller doses than in the male. (See section on Gonorrhœa in the Male.) In some cases these agents produce marked relief in the symptoms and a lessening of the discharge, and,

<sup>1</sup> *Gazette de Gynéc.*, 1894, vol. ix. pp. 18 et seq.

<sup>2</sup> *Thèse de Paris*, 1894.

again, they seem to be of no benefit at all; from which it follows that local measures are always the most certain.

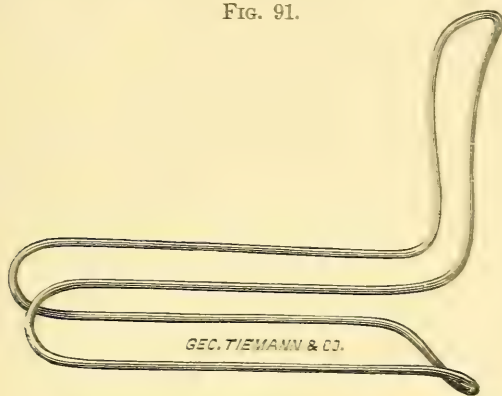
It is necessary to repeat that in chronic urethral and vulvar gonorrhœa in women the patients are apt to be careless and indifferent in the stage of decline, which, added to the setbacks incident to menstruation, tends to perpetuate their trouble. At this time the surgeon should accentuate his injunctions to follow treatment, to be as quiet as possible in every way, and to abstain from any errors in eating or drinking.

GONORRHOEA OF THE VAGINA.—Gonorrhœa of the lower part of the vagina, which is commonly accompanied with the same affection of the vulva and perhaps of the urethra, should be treated on the principles already given. As soon as the acute symptoms subside, copious irrigations of very hot water well into the canal should be made. Then, as soon as the irritability of the parts will permit, the surgeon should make a thorough examination, having at his command a perfect light, natural or artificial. In my judgment, the genu-pectoral position, though objectionable to patients by reasons of delicacy of feeling and of its uncomfortableness, is by far the best to obtain a thorough view of the whole vagina, including the cervix uteri and the posterior and the anterior fornix vaginae. The blade of a Sims speculum carefully introduced elevates the posterior vaginal wall, and free inspection is possible. Where the surgeon works without the aid of an assistant the adjustment to the Sims speculum devised by Dr. Cleveland may be used, with much help. When the very acute symptoms of gonorrhœal vaginitis have begun to subside, the inflamed surfaces may be carefully and thoroughly cleansed by means of a cotton-holder. Then the whole surface may be exposed by the wire speculum, and then gently and sparingly touched with a thirty-grain-to-the-ounce solution of nitrate of silver, after which the canal should be thoroughly irrigated with hot water to which a little common salt has been added. Another and less commendable and precise way of applying the nitrate-of-silver solution is to pass a Ferguson's speculum so as to encircle the cervix uteri, which is touched with the solution on a cotton-holder. Then one or two drachms of it are poured into the speculum, when, on withdrawal with a rotary motion, the solution will come in contact with the vaginal walls. After this application, which should be thoroughly made in the posterior and in the anterior fornix, and also to the uterus, usually as far as the os internum, the vagina should be thoroughly tamponed with iodoform gauze. Currier<sup>1</sup> claims that benefit will sometimes follow the application by means of the tampon of a mixture of subnitrate of bismuth and glycerin, one drachm to the ounce. In this I think, from experience, that as regards many cases he is perfectly right, though my preference is for a mixture containing double the quantity of bismuth. In my experience, tampons made of absorbent gauze are preferable to those of absorbent cotton, since they absorb more freely and do not give rise to the unpleasant and sometimes painful sensations caused by the bolus of cotton. In many cases, the nitrate-of-silver solution having been applied once or twice, much benefit will follow the deposition deep into the vagina of a considerable amount of powdered boracic acid, which must be retained by the gauze tampon. Whatever form of tampon is used, it should be

<sup>1</sup> *N. Y. Med. Journ.*, Oct. 24, 1885, p. 454.

removed with great care every twenty-four or forty-eight hours, and then copious hot-water injections should be made. The frequency and strength of the nitrate-of-silver applications should be determined by the

FIG. 91.



Wire speculum for applications to the vagina.

progress of the case. Usually, several days should elapse before a second is made, and if the patient is under control two or three are enough.

It is well to bear in mind that vaginal injections may be given, the patient lying on her back with her hips elevated, either by means of a Davidson or a fountain syringe, or by Dr. Foster's excellent vaginal douche.

In chronic vaginitis extract of *Pinus canadensis* may be used on tampons. Bichloride-of-mercury irrigations may in a measure allay the irritation, but they generally fail to produce a cure.

Schwartz<sup>1</sup> of Halle, believing that the annihilation of the gonococcus means the cure of gonorrhœa, recommends the following heroic anti-parasiticide treatment: The vagina and vulva are thoroughly cleansed with a 1:1000 solution of the bichloride. Then by means of a Sims or Bozeman speculum all the parts are swabbed, with the utmost care, with cotton-wool saturated with a 1 per cent. bichloride solution, taking care to rub off the superficial layers of the epithelium and to reach the folds of the introitus vaginæ. Then the vulva and vagina are dusted with iodoform, which to be effective should be rubbed in, and then the vagina must be packed with iodoform gauze, which should remain three days, at the end of which the process should be repeated. Another tampon of iodoform gauze is then inserted and allowed to remain five days, upon the removal of which, during eight or fourteen days, copious irrigations of the vagina with sublimate solution, 1:2000, should be employed. It is stated that after the second tampon the vagina is red and raw and the seat of a copious purulent discharge. While it is claimed that in Germany marked benefit has followed this method of treatment, I think that its employment should be much modified in the reduction of the solutions of the sublimate. It is well known that continuous irrigation of the vagina with a solution 1:5000 is commonly attended in a short time with irritation, which also sometimes affects

<sup>1</sup> *Op. cit.*



the hands of the nurse or surgeon. Then, again, many persons are subject to the iodoform idiosyncrasy, and the application of the drug causes violent local reaction and sometimes systemic poisoning. Therefore it should never be put recklessly in large quantities into any cavity, natural or artificial. I think, however, that with modifications and toning down Schwartz's treatment may be of benefit.

A number of new drugs have been used in the form of injections in the treatment of gonorrhœal vaginitis.

D'Aulnay<sup>1</sup> first thoroughly swabs the vagina with a 1 per cent. sublimate solution, and then tampons the cavity with absorbent cotton or gauze moistened with a solution composed of methyl blue 10, alcohol 15, caustic potassa 0.2, and water 200. The application is left in the vagina for two days; then a copious irrigation is given and the remedy applied in the same manner again. It is claimed that this treatment soon produces a cure.

Retinol is well spoken of by Barbier,<sup>2</sup> who used it in Balzer's service. The parts are first freely irrigated, then gauze or cotton tampons moistened with the balsam are inserted in the vagina. A cure is said to be produced in from twelve to fifteen days.

Subacute and chronic gonorrhœal vaginitis may, according to Schwimmer,<sup>3</sup> be cured by the use of alumnol, by insufflation or irrigation of the canal, in two to eight weeks.

In Hirtz's service at the Lourcine Hospital, Dubard<sup>4</sup> used on tampons and by smearing a solution consisting of 12 per cent. of resorcin in glycerin. If the application caused pain, cocaine was used locally.

**Treatment of Gonorrhœa of the Os and Uterine Cavity.**—There is no form of gonorrhœa in women that demands greater skill, judgment, and conservatism than gonorrhœal infections of the os and uterine cavity. In these delicate parts energetic treatment should be promptly instituted in order to prevent, if possible, the further upward spread of the infection. Unfortunately, the general practitioner is, as a rule, not sufficiently versed in the course of the disease and skilled in its handling to warrant his active intervention in these cases, and my advice to any one not thus equipped is, when he has these cases under his care, to promptly call in the aid of a wide-awake but conservative gynecologist.

Tixeront<sup>5</sup> has shown that intra-uterine irrigations with solution of permanganate of potassa, 1:1000 and 1:500, may be of benefit.

It is well for the surgeon to bear in mind these facts: In these cases the disease quickly localizes itself deeply in the mucous membrane of the cervix, and there assumes a chronic condition which at any time under stimulation may become acute. To treat these cases properly the os must be dilated, and then the mucous membrane must either be curetted or to it must be applied quite strong caustic solutions (chloride of zinc, Lugol's solution, etc.). These operations should be done with special skill and good judgment under favorable home or hospital con-

<sup>1</sup> *Bull. gén. de Therapeut.*, 1893, vol. cxxiv. pp. 396 et seq.

<sup>2</sup> *Thèse de Paris*, 1890.

<sup>3</sup> *Archiv für Derm. und Syph.*, vol. xxix., 1894, p. 157.

<sup>4</sup> *Thèse de Paris*, 1889.

<sup>5</sup> *Annales des Mal. des Org. Gén.-urin.*, vol. xi., 1893, pp. 47 et seq.

ditions and with the utmost regard for asepsis and antisepsis. Therefore I say that, as a rule, these cases do not belong to the genito-urinary surgeon, but should be treated by men well versed in women's diseases.

In the treatment of abscess of Bartholin's glands general surgical principles should prevail. If an incision is necessary, it should be freely made over the most fluctuating part of the tumor. Then, after thorough antiseptic irrigation, the parts should be well packed with iodoform gauze, which when the inflammatory symptoms have subsided may be replaced by balsam-of-Peru gauze. These packings should be carefully applied until full healing has been produced. In chronic cases it is good surgery to extirpate the gland as soon as possible, since it is almost certain that exacerbations will occur sooner or later.

Whenever the anatomical arrangement of the parts will allow of the slitting up of the various follicles in the vulva and urethra when the seat of chronic gonorrhœa, this little operation should be performed with all antiseptic care. Then, after cauterization with a solution of nitrate of silver (3ss to ʒj water), the little cavity should be packed and caused to heal from the bottom. Sometimes these little inflammatory foci cause much trouble to the surgeon, and ultimately it is necessary to extirpate them.

## CHAPTER XXXI.

### VULVO-VAGINITIS IN INFANTS AND YOUNG CHILDREN.

WITHIN the last twelve years much light has been thrown on the subject of inflammation of the vulva and vagina of young children by a number of essays which contain important information as to its clinical history, etiology, and bacteriology. Prior to the year 1879 little of a definite character was known concerning this affection: to-day our knowledge is greater and clearer. Yet even now there are many obscure points which the future may perhaps clear up.

Vulvo-vaginitis may occur in the newly-born infant shortly after birth and during its first half year of life, and it has been observed in the latter part of the first and in the second year. There is, however, a remarkable unanimity of statement that it occurs most frequently between the ages of two and ten or twelve years. In other words, when the child is cared for by its mother or nurse it is usually less likely to become affected with vulvo-vaginitis. When, however, it begins to mingle with other children or to sleep with older persons, then it becomes more liable to the affection. This fact is well brought out by Comby,<sup>1</sup> who found in 151 cases of vulvo-vaginitis that in 84 the children were over two and under ten years of age.

Vulvo-vaginitis—or urogenital blennorrhœa, as Cahen-Brach<sup>2</sup> pro-

<sup>1</sup> "Étude sur la Vulvo-vaginite des Petites filles," *Bull. et Mém. de la Soc. méd. des Hôpît. de Paris*, 3d Series, 1891, vol. viii., pp. 395 et seq.

<sup>2</sup> "Die Urogenitalblenorrhœe (gonorrhœe) der kleinen Mädchen," *Deut. med. Wochenschr.*, 1892, vol. xviii. pp. 724 et seq.

poses to call it, being more precise and anatomically correct—occurs in an epidemic, an endemic, and a sporadic form. A number of classifications of this affection have been offered, but for purposes of clearness and simplicity of description it is only necessary to consider the simple or catarrhal and the severe or so-called gonorrhœal varieties. The so-called phlegmonous vulvitis is simply one or the other of these forms complicated by abscess-formation, and is sometimes the result of traumatism, while aphthous or diphtheritic vulvitis is an accident—an acute infective process occurring usually, and complicating a simple vulvovaginitis in subjects suffering from diphtheria, the exanthemata, and typhoid fever. In like manner a gangrenous form has been spoken of, but it has not a distinct entity, for the gangrene develops as an accident in poorly-nourished, sickly children usually suffering from an infectious disease.

Vulvo-vaginitis in infants and children is mostly seen among poor, ignorant, careless, and dirty people, and therefore is found, for the most part, at dispensaries, hospitals, and maternities.

Before considering the disease it is well to think of the structures and tissues attacked by it. The external genitals of the young female differ from those of girls approaching maturity. In the young child the nymphæ are commonly more prominent than the labia majora and the vulva; the urethra and the hymen are comparatively prominent, even protuberant. Further, there are no pudendal hairs to serve as a protection to the parts. All the structures are therefore much exposed and liable to traumatisms of all kinds and to irritation from secretions of the vagina and rectum, and to dirt and general uncleanness. Further, the tegumentary tissues are soft, very vascular, and prone to become hyperæmic. In fact, everything about the female genitals in early life tends to offer a favorable soil to any infective process, mild or severe. In this connection it is well to bear in mind the facts stated by Epstein,<sup>1</sup> based on careful observation. He says that we often see in new-born girls a more or less abundant secretion in the form of a viscid, gelatinous, glassy, milk-like mass lying in the vulva. This mass may be continuous with an extension or plug of similar nature seated in the vagina, and is composed mostly of flat epithelium. In a few days the mass breaks up into a paste-like or creamy secretion, which may look like pus and in which large quantities of round cocci are found. This condition, which Epstein calls the “desquamative catarrh of the new-born,” may last two or three weeks, and on disappearing may leave the parts in a healthy condition. Further, Epstein remarks that a catarrhal vulvo-vaginitis may be added to this normal desquamative process; the mucous membrane may become hyperæmic, then inflamed, and the secretion may become muco-purulent and then purulent. All this may occur from uncleanness, dirt, decomposition of urine, and lodgement of fæces. A low and depraved condition of the system renders the infant very susceptible to this purulent form of inflammation.

Thus we see at the very outset that the topography of the parts and the conditions to which they are subjected all tend to render them vulnerable to irritations inherent in them and to invasion from without.

<sup>1</sup> “Ueber Vulvo-vaginitis gonorrhœica bei Kleinen Mädchen,” *Archiv für Derm. und Syphilis*, 1891, vol. xxiii., Ergänzungsheft 2, pp. 3 et seq.



Further than this, it must be remembered that the urethra, the vulva, and the vagina harbor as hosts innumerable and varied micro-organisms, many of which under all circumstances are harmless, but some of which in altered conditions of the tissues may become active and harmful.

**SIMPLE VULVITIS.**—This form may be found in very young infants and in children from two years onward, and exceptionally even up to puberty.

The attention of the mother is first called to the trouble by the cries of the child on urination and by the frequency of the act. Examination shows the vulva alone to be involved, or this part and the urethra together, or these external parts and the vagina are found affected.

If there is simple vulvitis, we find redness and swelling of the nymphæ and the labia majora (as much of them as is developed), and at first a sero-epithelial secretion looking like milk, then later on a mucopurulent discharge. The surface of the mucous membrane is eroded in minute spots and goodly-sized patches. The child's pain is then mainly caused by the scalding sensations caused by the urine lodging on the excoriated surface. Spontaneous pain may result from the vulvar inflammation.

A further form of simple vulvitis consists in moderate heat, redness, and swelling of the parts, from which pus or muco-pus exudes. Thus there are in these young infants two forms of vulvitis—the one mild and ephemeral, with a sero-epithelial discharge moderate in quantity, and the other more severe and attended with greater inflammation and a muco-purulent discharge.

Care and proper medication will soon cure these conditions. When, however, cases are neglected the morbid process extends to the contiguous parts.

**VULVO-VAGINITIS.**—This affection is found in very young infants and in children from two to thirteen years old.

In infants vulvo-vaginitis usually begins as a vulvitis, which, being uncared for, becomes more intense and spreads either to the vagina or to the urethra, or to both. As a result there is produced a very formidable affection for such a young subject. In many cases the urethra is not infected, but there seems to be a tendency for the morbid process to extend through the hymeneal introitus and to involve the vagina and perhaps the cervix uteri.

Examination shows a reddened, eroded surface of the vulva, hymen, and vagina. A copious purulent or muco-purulent secretion escapes from the parts, and it may dry in crusts on the labia majora or even on the thighs. The pus may be thin, and again thick, even to being so gelatinous that it can be taken up by the forceps. In this condition the infant's sufferings are quite severe.

The tendency of the disease is to persist unless proper treatment is adopted, and even then it may run on for months and end in a mild and chronic catarrhal process. When the urethra is involved the child's sufferings are much increased.

When simple vulvo-vaginitis attains a very severe grade of intensity, it is practically impossible to diagnosticate it from the so-called gonorrhœal form. It will be seen later that the microscope often gives us very little aid.

The statement has been made that the pus of simple vulvo-vaginitis is not infectious, but there are many facts in existence to prove that it is often highly infectious. It is sometimes noted that an infant becomes affected with this disease, and soon after the other children are attacked by it or by purulent ophthalmia. I saw a severe epidemic of vulvo-vaginitis in Charity Hospital which was traced to a child suffering from the simple form of the affection. This fact has been observed in other epidemics.

The clinical features of phlegmonous vulvitis are those of follicular abscesses or even abscess-formations usually involving a labium, in addition to the vulvar inflammation. In the aphthous or diphtheritic variety there are present, besides the severe catarrhal process, patches of false membrane of a dirty-white or brownish color seated on an excoriated surface.

Gangrenous vulvitis is an analogous condition to noma as seen in the mouth. It occurs in poorly-nourished and uncared-for infants. More or less tissue sloughs away, but it is astonishing how thoroughly Nature repairs the injury, so that in some cases little trace of the destructive process is left. Diphtheritic and gangrenous vulvitis is usually a concomitant of some general infective process.

### **The So-called Gonorrhœal Vulvo-vaginitis.**

It must be distinctly understood that vulvo-vaginitis is very rarely of venereal origin, and that, if the suppuration does originate in gonorrhœal pus, the infection in most cases takes place in an indirect manner through some medium or agent.

Since so little is really known as to the mode of origin of this form of vaginitis, and as its onset is unlooked for and insidious, the affection is well on in its course before it is seen by the surgeon. We have no precise data as to the period of incubation, but we are warranted in assuming that the morbid process begins in mild and localized hyperæmia. When first seen these children present the evidence of suffering in their uneasiness and their cries. When the cervix uteri is involved they also suffer from bellyache. We find an intensely red and tumefied, superficially eroded, and even bleeding condition of the vulvar structures of the introitus vaginae, of the vagina itself, and also of the cervix uteri, from which pus may drip. A profuse yellowish-green discharge escapes from the hymeneal orifice and is found smeared over the vulva. Very often this pus dries into crusts upon the labia majora and upon the inner surface of the thighs. There is very often intertrigo, even of a severe type, on the latter regions. When the urethra is involved urination is frequent and painful. Then when the urine flows over the inflamed vulva the child's sufferings are great.

The course of the affection is dependent upon the care given the child and the nature of the treatment adopted. Under the most favorable conditions the affection is often very obstinate, and in neglected or insufficiently cared-for infants it runs on indefinitely unchecked. If a child afflicted with this disease is cured in two or three months, the result may be pronounced to be brilliant. In very many cases the disease runs on and ends in a chronic catarrhal condition.

In some cases the inguinal ganglia become swollen and painful. There are well-attested cases on record in which peritonitis resulted from this form of vulvo-vaginitis. Those reported by Hatfield,<sup>1</sup> Lorén,<sup>2</sup> and Huber<sup>3</sup> are of much interest. As stated by Martin, Dr. R. Curtin has seen endometritis as a complication of this affection. Currier<sup>4</sup> says that it seems to him very probable that many of the deformed and undeveloped uteri, with which are associated so much dysmenorrhœa and anguish, sterility, and domestic unhappiness, are the legitimate consequence of vulvo-vaginitis which had travelled from the vagina to the uterus and tubes in early life.

There can be no question as to the infectious quality of pus derived from this disease, since there are many cases on record in which it has produced severe vulvo-vaginitis and also intense purulent ophthalmia, which as a complication of the disease stands first. This form of the affection is seen in babes in the arms and in young children from two to ten years old. In families we see sporadic outbreaks, and in hospitals and maternities more or less severe and extensive epidemics.

Gonorrhœal rheumatism is, according to statistics, a rather rare complication of purulent vulvo-vaginitis. Hartley<sup>5</sup> reported a case of joint-swelling in a child, in whom it appeared that the infection originated in rape. Two other cases are also reported by Koplik,<sup>6</sup> and a fourth by Goldenberg.<sup>7</sup>

**Etiology.**—In the cases of young infants it is often impossible to learn any facts as to the source of infection. It is claimed by Pott<sup>8</sup> that he has seen specific vulvo-vaginitis in the child contracted from its mother (who suffered from gonorrhœa) during the process of delivery. Such a mode of infection is certainly possible, but before it is accepted in an unqualified manner we must have the facts concerning it clearly proved in a number of cases, and fortified with an entire concordance in the microscopical findings in mother and infant.

Usually infants are brought suffering from vulvo-vaginitis when they are some weeks or months old. In very many instances the only assumption warranted is that the more or less severe process began in the physiological hyperæmia which is constantly present in young children. In absence of negative proof it may be confidently asserted that many cases of this affection originate *de novo*, without the implantation of an infectious secretion.

Undoubtedly, many infants are infected by some means from pus from the vaginæ of their mothers or nurses. I have heard of mothers and nurses who quieted their infants and charges by placing a finger in the vulva, and I can understand that a soiled finger might carry infection. Then, again, sponges used by mothers suffering from leucorrhœa

<sup>1</sup> *Archives of Pediatrics*, 1886, p. 641.

<sup>2</sup> *Higiea*, vol. xlviii. p. 607; and *Jahr. für Kinderheilkunde*, vol. xxvi. p. 410.

<sup>3</sup> *Archives of Pediatrics*, Dec., 1889, p. 887.

<sup>4</sup> "Vulvo-vaginitis in Children," *Med. News*, July 6, 1889.

<sup>5</sup> "Gonorrhœal Rheumatism, especially in the Female," *N. Y. Med. Journ.*, April 2, 1887.

<sup>6</sup> "Arthritis complicating Vulvo-vaginal Inflammation in Children," *ibid.*, June 21, 1890.

<sup>7</sup> "Gonorrhœal Rheumatism in Early Childhood," *ibid.*, July 23, 1892.

<sup>8</sup> "Zur Aetiologie der Vulvo-vaginitis im Kindesalter und ihre Behandlung," *Jahr. für Kinderheilkunde*, vol. xix., 1883, pp. 71 et seq.



have been also used upon their infants, who became affected with vulvo-vaginitis. It is claimed that pieces of soap used on infected infants have conveyed the disease to the healthy. The details of Hatfield's case warrant the suspicion that infection of the child resulted from use of a syringe used by its father, who suffered from gonorrhœa. It sometimes happens that excited mothers bring children thus affected, claiming that they have been tampered with and infected by a man. Such, certainly, may be the case, but most commonly older children are selected for purposes of rape. Walker<sup>1</sup> reports 21 cases in which there was a history of contact with parents who had the disease or with other infected persons who had committed assault and rape.

When the child of poverty and squalor gets out of arms and sleeps and mingles with older girls and women, it is liable to contract vulvo-vaginitis accidentally, conveyed by means of infected fingers, and mainly by soiled under-wear, sponges, and towels. From one suffering child other members of the family or its playmates may be infected in the vulva or the eyes by either the simple catarrhal or the so-called gonorrhœal form of the disease:

Among older girls direct gonorrhœal infection may occur as a result of attempted or complete coitus with young boys. There are many such instances in medical literature. Then, again, infection may occur among several or many young girls through their own bad habits. Atkinson<sup>2</sup> relates the facts of a small epidemic of purulent vulvo-vaginitis in young girls at a boarding-school, by which it appears that they crept into each other's beds and titillated each other's genitals. In this epidemic purulent ophthalmia and stomatitis were also prevalent.

The records of a number of epidemics bring out many interesting and important facts, and unfortunately leave many in doubt and uncertainty.

Ollivier<sup>3</sup> states that in his asylum there were three young children suffering from this disease, and that within three weeks twelve others were attacked. It was found that after caring for the original three infected children the nurses did not wash their hands before attending to the uninfected, and that they used on the healthy the same sponges with which they washed the infected children. They passed presumably pus-soiled chambers from infected to healthy children, and allowed all to sit on the same wooden seat of the water-closet, which was no doubt smeared with infecting pus. These facts throw a flood of light upon the matter of prophylaxis.

The details of the great epidemic of Posen, recorded by Skutsch,<sup>4</sup> carry with them an awful lesson. In an institution for children within fourteen days 236 female children became affected with purulent vulvo-vaginitis. The origin of the infection, whether from one child or several children, is not known, but it is very evident that the massing together

<sup>1</sup> *Archives of Pediatrics*, 1886, p. 269.

<sup>2</sup> "Report of Six Cases of Contagious Vulvitis in Children," *Am. Journ. Med. Sciences*, vol. xcv., 1878, pp. 444 et seq.

<sup>3</sup> "Note sur la Contagiosité de la Vaginite des petites Filles," *Bull. de l'Acad. de Méd.*, 3d Series, vol. xix., 1888, p. 56.

<sup>4</sup> "Ueber Vulvo-vaginitis Gonorrhœica bei Kleinen Mädchen," *Inaug. Dissert.*, Jena, 1891. Other interesting essays, giving histories of epidemics, are as follows: Cséri, *Wien. med. Wochenschr.*, vol. xxxv., 1885, pp. 703-739; Fränkel, *Archiv für Path. Anatomie*, vol. xcix., 1885, pp. 276 et seq.; Von Dusch, *Deut. med. Wochenschr.*, vol. xiv., 1888, pp. 831 et seq.; and Martin, *Journal of Cutaneous and Gen.-urin. Diseases*, 1892, pp. 415 et seq.

of large numbers of children in brine-baths afforded the opportunity for the dissemination of the disease.

Basing their opinion on microscopical findings, many authors to-day, following the lead of Pott, unreservedly consider the majority of cases of vulvo-vaginitis as of gonorrhœal origin, the infection having taken place in an indirect and often unknown manner. We find that in this affection also many authors claim that they have found the gonococcus, when it is evident from their writings that their examinations have been superficially made.

In some cases of the simple variety the microscope affords definite aid. Thus, as has been well shown by Koplik in a valuable essay,<sup>1</sup> in the pus of simple vaginitis there are found rods, cocci, and diplococci in the leucocytes, and besides a pseudo-gonococcus, somewhat similar to the gonococcus, seated on epithelial cells. The whole microscopic picture is so different from that presented by true gonorrhœal pus that even with a limited experience the surgeon will readily recognize its simple nature. It is true also, as claimed by Berggrün,<sup>2</sup> that in these mild cases we find staphylococci and streptococci.

On the other hand, in severe cases of vulvo-vaginitis the microscopic picture of the secretion is strikingly similar to that of gonorrhœa of the adult male or female. Thus it would seem to be very easy to determine the character of a uro-genital discharge of a young child, but, really, such is not very often the case. Thus we frequently see a child with a profuse purulent discharge from very much inflamed genitals which under the microscope presents a micro-organism answering in every way to the description of the gonococcus. Yet an exhaustive and critical study of the case and its environments may show that there is no basis whatever upon which to fix a diagnosis of gonorrhœa. Even so eminent a bacteriologist as Fränkel had his misgivings as to the nature of the micro-organisms he found in the pus of the Hamburg epidemic. It seemed to him to be the gonococcus, but the histories of his cases would not warrant an unequivocal diagnosis of gonorrhœa. I have seen cases in which no history of gonorrhœa could be obtained, yet the microscopical picture of the secretion seemed that of gonorrhœa.

This being the state of affairs, we certainly cannot from microscopic findings alone unequivocally pronounce a case to be of gonorrhœal nature unless its history in all its details is in accord with that view. This, to my mind, clearly shows that from a medico-legal standpoint the mere finding of the gonococcus or the supposed gonococcus in the uro-genital secretion of a child only proves that the disease possibly originated in gonorrhœa.

Succinctly stated, the truth of this question of etiology is this: In many cases the clinical history and microscopic picture establish a diagnosis of simple catarrhal vulvo-vaginitis; in other cases the clinical and microscopical evidence points clearly to gonorrhœa; but in still other cases, though the symptom-complex is complete and the microscopical picture points to gonorrhœa, absolutely no evidence can be obtained to

<sup>1</sup> "Uro-genital Blennorrhœa in Children," *Journal of Cutaneous and Gen.-urin. Diseases*, 1893, pp. 219 and 263 et seq.

<sup>2</sup> "Bakteriologische Untersuchungen bei der Vulvo-vaginitis Kleinen Mädchen," *Archiv für Kinderheilkunde*, 1893, vol. xv. pp. 321 et seq.

prove that the disease has had a venereal origin or has originated in gonorrhœal pus. On the other hand, all facts point to the suppuration having begun in a simple catarrhal form, and by reason of dirt and uncleanness has assumed all the features of a severe gonorrhœal inflammation. I am clearly of the opinion that in many cases which have been regarded as undoubtedly of gonorrhœal nature the morbid process originated *de novo* in a simple catarrhal process.

There can be no doubt that onanism, eruptive fevers, seat-worms, pediculi, eczema, and perhaps impetigo and herpes, act simply as contributory causes. They establish a low form of irritative process, and thus render the tissues susceptible to microbic invasion and inflammation, while dirt, the exposed condition of the parts, unremoved discharges, and general uncleanness and want of care combined contribute to the production of a very formidable suppurative process.

**Treatment.**—The first duty of the surgeon in all cases of vulvovaginitis is to insist upon the observance of absolute cleanliness of the infant, of its clothes, and of its surroundings. The next is the enforcement of prophylaxis for the children and adults of the family. These facts must be vividly impressed upon the mother or nurse or upon any one who may temporarily care for the child.

In hospitals and nurseries a child should be isolated immediately that it is discovered that it is infected, and if possible it should be cared for by nurses who wait on it alone. A nurse having charge of a child thus affected should not be allowed to care for other, non-infected, children. In the event of necessity, when a special nurse cannot be detailed to the case, she should be thoroughly instructed as to how not to carry infection or allow it to occur in uninfected children. By rigid discipline the spread of the disease (which in some epidemics is like wild-fire) may be limited to the original case or cases.

In newly-born children whose mothers have been known to suffer with a vaginal discharge it is well, as suggested by Epstein, to apply to the vulva the prophylactic measure recommended by Credé for the eyes—namely, the careful washing of the part and the application of a few drops of a 2 per cent. solution of nitrate of silver.

The desquamative catarrhal condition of the genitals of new-born girls may be treated by cleanliness, by free injections into the vagina of warm solutions of boric acid or diluted Goulard's water, followed by cleanliness and dryness of the parts, obtained by means of some dusting powder. Whenever it is possible in these cases a pledget of absorbent cotton should be placed in the vulva and it should be frequently renewed.

Currier speaks well of subnitrate of bismuth in this affection generally, and Comby states that he has seen benefit in vulvar cases by dusting the surface with powdered salol and then applying cotton. When the vagina also is affected this author advises the insertion into that tube of salol bougies (10 centigrammes of salol to 1 gramme of cocoa-butter).

For severe cases of the simple and so-called gonorrhœal type a carefully conducted, methodical treatment is necessary. Very thorough irrigation of the parts with a warm bichloride solution (1:6000 or 1:10,000) may be used several times daily. After this cleansing process the vagina should be expanded by means of a double-bladed male



urethral speculum or by my own urethral speculum, and the parts made dry by absorbent cotton on an applicator. Then a 10 per cent. nitrate-of-silver solution is carefully applied to the whole inflamed surface. This treatment is mainly that recommended by Koplik, and is usually productive of good results. The applications should be made by the surgeon or by an intelligent nurse, and they should be thorough. As Koplik says, infants struggle and resist when any mode of treatment is used, so it is necessary to have a convenient table, good light, and all suitable instruments and appliances ready at hand. This author states that he has refrained from treating the urethra, since the parts are so small, and the pain resulting from interference with this canal by our present methods do not justify persistence in efforts of treatment. Alkaline mixtures containing tincture of hyoscyamus may be given with benefit to relieve the burning on urination.

Thallin and iodoform in bougies may be used, but there is no certainty of good resulting from them.

Under the application of the solution of nitrate of silver benefit will be noticed in the change in the color of the discharge from a greenish to a grayish milky hue, and the gonococci (if found in the course of the case) will become much less numerous in the specimens examined. In this event the treatment may be continued by means of warm irrigations of nitrate of silver (1 or 2:2000), given once or twice a day. In almost every case the curé will be slow and exacerbations may be expected, and the patience of the surgeon and fortitude of the mother may be sorely taxed. Still, in any event, care must not be relaxed nor should the treatment be suspended.

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## CHAPTER XXXII.

### STRICTURE OF THE URETHRA.

A FULL knowledge of chronic anterior and posterior urethritis and of their pathological anatomy is absolutely essential to the clear comprehension of the nature and course of stricture of the urethra. While true gonorrhœal stricture of the urethra is only found in the anterior part of the canal, it is very essential that the inflammatory condition of the posterior part which frequently coexists should be well understood. It is necessary to emphasize this point, since nearly all authors concern themselves solely with the morbid changes which take place in the anterior urethra.

It has already been shown (see page 78) that in chronic anterior urethritis the essential lesion is a more or less extensive small-cell infiltration into the submucous connective-tissue layer and a chronic catarrhal condition of the mucous membrane itself. These pathological conditions may disappear, perhaps spontaneously in some cases, but generally as the result of treatment. On the other hand, when this localized inflammatory

process persists for a very long time, it leads to certain permanent cell-changes which materially lessen the calibre and impair the dilatability of the urethra and interfere with its function.

In previous years, when our knowledge of urethral pathology was quite limited and far from clear, stricture of the urethra was defined in the following terms: Any loss of dilatability of the urethra; all encroachments on the average normal urethral calibre; any abnormal lessening of the calibre and dilatability of the canal. To one familiar with the subject all of these definitions will appear to be unsatisfactory and incorrect. Thus, in primary acute gonorrhœa the dilatability of the urethra is more or less impaired, yet there is no stricture. A papillomatous growth or an inflamed follicle may encroach on the urethral calibre, yet neither one constitutes what we know as stricture. In chronic anterior urethritis the calibre of the canal may be narrowed by submucous exudation and epithelial hyperplasia in patches and areas, both of which impair its dilatability, yet it would be rash to say that a man thus affected had stricture of the urethra until the morbid process had become so chronic and inveterate that true structural constricting change had taken place in the urethral walls. With these exclusions and in the light of our present knowledge we may define stricture of the urethra to be a condition of the canal attended by decidedly well-marked contraction or stenosis, and an utter loss of normal dilatability caused by an inflammatory process which produces a sclerosis of greater or less density and contractile power.

In most cases of chronic anterior urethritis the submucous exudation remains in the small round cellular condition for varying periods, in some cases short, and in others long. There is present in all such cases the leaven of stricture of the urethra. When this infiltration is quite dense it constitutes what is known as soft stricture. When these round-cells begin to change into fusiform cells and to form fibrous or cicatricial tissue, a true incipient stricture begins to form which may then be called semi-fibrous stricture. As we shall see later on, we have means at our command to determine quite accurately the stage and character of a urethral infiltration and whether it constitutes a soft or a semi-fibrous stricture.

There is great diversity in the extent and depth of stricture-formation, which should be clearly understood. In some cases the sclerosis is soft and yielding, and in others it has more density and resistance. In some patients the cell-changes incident to the production of a true sclerotic condition take place very slowly, and in others more rapidly, while in some exceptional cases the development is very rapid indeed. In very many cases the morbid process is sharply limited to the submucous connective-tissue coat, which may be involved to a greater or less extent. Thus there may be a simple narrow band of stricture-tissue, which may occupy only a small part of the circumference of the tube, or it may be more extensive, even to the formation of a ring. (See Fig. 118.) Perhaps an inch or two of the canal may be the seat of morbid change, and, again, a larger segment may be involved. In the pendulous urethra we not uncommonly find three, four, and even five inches of the canal the seat of true stricture-formation. Then in the subpubic curve a part of the canal may be found stenosed, and in somewhat rare and old cases the bulbous part in its totality is involved. These sharply-limited submucous

strictures therefore may be simply thread-like, and may form incomplete or complete rings. They may involve less than an inch or more of the canal, or they may convert a large portion of it into a distinct pathological tube. As to density, these strictures may remain tolerably soft for long periods. Then, again, as they grow older, they become more or less firm, and later on even fibrous. Clinical history and pathological anatomy show that the morbid process may remain limited for years in the submucous coat.

In the cases just considered, therefore, the morbid process has not extended beyond the submucous layer, the corpus spongiosum remaining intact. In a severe class of cases, however, there is a greater or less invasion of the corpus spongiosum. The lesion in these cases is the same small round-cell infiltration which is exuded into the superficial meshes of the erectile tissue. This condition may be properly termed "peri-urethritis." The infiltration into the spongy tissue may not only be scant and superficial, but it may also be copious, dense, and more deeply penetrating, even to the localized or extended involvement of the whole thickness of the spongy body. In some cases the corpus spongiosum becomes affected by means of the crypts and follicles imbedded in it. These strictures become the seat of an infiltration which may become perifollicular, in which case a nodule is produced, and from this focus more or less of the spongy tissue may be invaded. These little nodular masses may not uncommonly be felt in the pendulous urethra.

In the great majority of cases, particularly in men up to forty-five years of age, the corpus spongiosum of the pendulous urethra is only superficially infiltrated, and its distensibility and extensibility are not much, if at all, impaired. When such a urethra, involved for several inches, is carefully palpated, it will be found that the canal is distinctly round, tense, and dense in structure. If three or more inches are affected, it can be ascertained that the normal extensibility is somewhat impaired. Yet in these cases, though there may be more or less impediment to micturition, there is usually not much impairment of the parts when the penis becomes erect. It is quite rare to find extensive, deep, and total infiltration of this tissue in these parts.

In the subpubic curve, particularly in the bulbous portion of the urethra, there seems to be a marked tendency to extensive, and often total, involvement of the spongy tissue. This deep-seated infiltration may be found as far forward as the peno-scrotal angle. The cell-infiltration, however, shows a tendency to become more extensive as it passes down the canal and reaches the height of its development in the bulbous urethra at its junction with the membranous segment. Total infiltration of the corpus spongiosum, or cavernitis, is not very infrequently met with in the form of a hard, round, cord-like mass at the peno-scrotal angle and extending for an inch or more down the canal.

At the bulbous portion of the urethra, with the expanded and much thicker spongy body encircling it, the round-cell infiltration becomes more exuberant than elsewhere. Here the tissues are soft and succulent, and the blood-supply is copious. Here also there is no firm, fibrous capsule around the bulb; therefore there is not that hindrance to profuse hyperæmia and inflammation that there would be if the parts were quite firmly invested in dense tissue. For these reasons the post-gonorrhœal



inflammatory process is severe and long-lasting, and its resulting cell-infiltration exuberant and extensive. In the bulb, therefore, the infiltration is at first inextricably mixed with muscular and elastic fibres and vessels, and the condition called soft stricture then exists. The morbid condition then consists of round-cell infiltration with a tendency to the development of fibrous tissue. When this fibrous tissue is tolerably copious and intermixed with the round-cell infiltration, the resulting contraction is of semi-fibrous structure. Then, as time goes on and the morbid process increases very decidedly in extent and depth, the newly-formed fibrous tissue takes the place of the erectile and vascular tissues, the areolæ are obliterated, and the normal structure of the parts becomes wholly lost and replaced by a uniform sclerotic and atrophic fibrous tissue, white, firm, and homogeneous in structure, which constitutes what is called inodular stricture.

This division of strictures into soft, semi-fibrous, and inodular and densely fibrous strictures is based on well-attested pathological facts, and is worthy of acceptance, since it conforms accurately to the clinical history of these coarctations.

In the early stage of the stricture-formation the mucous membrane rests on the infiltrated submucous connective-tissue layer, but when the process reaches the inodular stage, either in the pendulous or the bulbous urethra, the mucous layer then rests directly on the fibrous tissue.

Recent pathological and clinical studies have thrown a flood of light upon the course and development of urethral strictures. In olden times it was thought that strictures always began in a ring of infiltration, and that, if there were several of them, they were each a separate morbid entity. This idea, in the main, is incorrect. In somewhat exceptional cases in the pendulous urethra we may find what may seem like a large number of distinct tight bands, six to fifteen perhaps in number, yet these are not true strictures. They are simply folds of mucous membrane more densely infiltrated than the tissue on either side of them. They result from the stenosis of more or less of the pendulous urethra. Not infrequently, true stricture begins in a little thickened patch or area of the pendulous urethra, seated perhaps on one side or on the upper or lower wall of the canal. If not dissipated this focus of infiltration becomes larger as time elapses, and it may lead to a true annular stricture. It may be remarked that almost all old strictures are annular. Baraban<sup>1</sup> has clearly shown that the morbid process may be far from uniform in development, and that patches and small foci of infiltration may be joined together among tissues less affected. Wassermann and Hallé<sup>2</sup> in their studies found the sclerosis of the urethra to be present in various degrees of development and severity. In old men the subjects of strictures for many years they saw evidences of a progressive increase and invasion of the infiltrating process. Fully-formed stricture-tissue usually increases in thickness, particularly near and in the bulb; and from such a stricture the infiltration may extend anteriorly to other parts of the canal. I have

<sup>1</sup> "Sur les Modifications épithéliales de l'Urèthre après Blennorrhagie chez l'Homme," *Revue méd. de l'Est.*, vol. xxii. June 15, 1890, pp. 361 et seq., and Oct., 1890.

<sup>2</sup> "Op. cit. Brissaud and Ségond ("Étude sur l'Anatomie pathologique des Rétrécissements de l'Urèthre," *Gaz. Hébdom. de Méd. et de Chir.*, No. 39, 1881, pp. 625 et seq.) in two cases found the upper wall of the spongy urethra the seat of soft inflammation, while the lower wall was the seat of true sclerotic change.

observed many conspicuous instances of this progressive invasion of the urethra, such as is well shown in the following personal case: A gentleman at the age of twenty-one had gonorrhœa, and at thirty complained of symptoms of stricture. His urethra (calibre 30 French) was quite firmly contracted at the depth of five and a half inches to No. 7 French. Gradual dilatation during five months restored the canal at the affected part to a calibre of 27 French. He then remained without any discharge and without any instrumentation whatever for seven years. Then examination of the canal showed that from three and a half inches down to the bulb it was quite uniformly and firmly contracted to No. 8 French, the bulb causing some slight bleeding as it passed over several soft-feeling bands. In this case, therefore, the exudative process in seven years crept up the urethra toward the meatus, a distance of two inches. In many cases, however, the process remains limited for years, but even when it has thus remained dormant it may later on become active and involve more tissue. This is the underlying cause of the extensive and deeply invading strictures which are not uncommonly found in old men.

In some very exceptional cases a peculiar form of stricture is found in the pendulous, and also in the bulbous, urethra. The cell-infiltration is quite copious and compact, and it converts the urethra, for a distance of several lines to perhaps more than an inch, into a firm fibrous tube lined with granulations or rugosities. In these cases the submucous tissue alone, or perhaps a little of the corpus spongiosum, is involved. The calibre of the canal may be reduced to 20 F., and there it will remain year after year with no tendency whatever to contract, and causing no symptoms other than slight dribbling at the end of urination. These cases prove obstinate to dilatation and all treatment, and in general they get along best when they are let alone.

It is important that clear ideas should be entertained as to the condition of the membranous urethra. There is a vagueness, almost amounting to ignorance, displayed by many writers, who speak of stricture of the membranous urethra and of "strictures six and a half inches down the canal in the membranous urethra." As a result of the study of 270 museum preparations, Sir Henry Thompson<sup>1</sup> concludes that stricture never exists beyond the bulbo-membranous junction, except as a result of traumatism. In an oral communication Dr. Gouley informed me that he sought for evidence of stricture of the membranous urethra in more than 500 dead-house specimens of urethral stricture, and had not found it in a single instance. I have carefully looked for this form of stricture in the living and in the dead, and have never found it. The studies of Wassermann and Hallé, however, show that synchronously with stricture in the pendulous urethra the membranous segment undergoes a number of changes. The most common change is dilatation of this part of the canal, and perhaps also of the prostatic urethra, in cases of chronic tight anterior stricture. The submucous connective tissue is sometimes the seat of a mild small-cell infiltration, but it never goes on to the production of stricture. Epithelial thickening is not uncommon, and little papillomatous tufts and masses are prone to form in this situation. These consist of enlarged vessels, embryonic tissue, and epithelial hyperplasia.

<sup>1</sup> *The Pathology and Treatment of Stricture of the Urethra, etc.*, 4th ed., London, 1885, p. 50.

Cystic degeneration of crypts and follicles may also be found in this region.

When the normal urethra is cut across at right angles to the axis of the penis, it presents a star-shaped appearance or it may be likened to a festooned slit. It is elastic and very compressible, and surrounded by the loose erectile tissue of the corpus spongiosum. When the seat of stricture, the urethra presents a variety of appearances when cut transversely to its long axis. Its tissue is whitish, hard, and inelastic. In the pendulous urethra the canal has a round or oval shape; it sometimes looks like a straight, transverse, or bow-shaped slit. In the region of the bulb it has an elliptical, triangular, and even quadrangular shape. All these distortions are due to the submucous cellular changes.

Gonorrhœal stricture of the prostatic urethra has never been found.

While the whole anterior urethra may be the seat of stricture, there are certain parts where it occurs more frequently. For convenience of description, Sir Henry Thompson divides the urethra into three parts, called the subpubic curvature, the centre of the spongy portion, and the distal portion. The first division includes the membranous urethra, which is never the seat of stricture. It is this inclusion of the membranous urethra in the stricture field that leads readers into error. Consequently, I will modify Thompson's division as follows:

Region No. 1, which begins at the bulbo-membranous junction, and includes one inch and a half of the canal up to the peno-scrotal angle, and which constitutes the greater part of the subpubic curve.

Region No. 2 begins at the anterior limit of the preceding, includes three inches of the canal, and ends within two and a half inches of the meatus.

Region No. 3 begins at the external orifice, and includes a distance of two and a half inches beyond it. (See Figs. 2 and 11.)

If this division be followed, we should hear no more of these putative strictures of the membranous urethra.

As to the frequency of occurrence of stricture in these three regions, the analysis of the findings of Sir Henry Thompson in the 270 museum specimens is very important. In these 270 specimens 310 distinct strictures were found, and were seated as follows:

In Region No. 1, 215, or 67 per cent. of the entire number.									
"	"	"	2,	51,	or	16	"	"	"
"	"	"	3,	54,	or	17	"	"	"

These statistics of post-mortem examinations are in accord with my own statistics in 250 personal hospital and clinic cases very carefully examined and recorded:

In 155 cases, or 62 per cent., the stricture was found in Region No. 1.									
"	50	"	"	20	"	"	"	"	"
"	45	"	"	18	"	"	"	"	"
Total, 250									

In most cases only one region (No. 1) was involved; in some cases Regions 1 and 2, and exceptionally Regions 1 and 3, were the seat of coincident strictures. The records show that in the great majority of cases there was but one stricture, and that less commonly two, three, and four were found.

Under the influence of the old conception of a stricture we understood



and spoke of a band, a ring, or a callous mass tunnelled by a small channel. In the light of recent pathological studies we know that gonorrhœal stricture of the urethra really means a stenosis of greater or less length of the canal, and that the infiltrating process is not uniformly developed, it being more advanced in some parts than in others. The urethral mucous membrane in the quiescent state of the penis and in the intervals of urination, besides being folded longitudinally, is also thrown in smaller transverse folds. Now, it seems that these transverse folds become infiltrated, and are thus rendered prominent and impinge on the calibre of the canal, and they constitute what we know as stricture bands or rings. Therefore, when we speak of these bands or rings we simply specify those portions of the urethral sclerosis which jut toward the axis of the canal most prominently. These bands and rings, however, are usually the surface indications of the underlying cellular infiltration, which is really the essential lesion. In some cases of nearly total invasion of the pendulous urethra, when the *bougie à boule* is gently pushed down to the bulb and withdrawn a jumping or bumping sensation is conveyed to the hand as the head of the instrument passes over thickened ridges. I have encountered as many as fifteen of these ridges or rings in a space of three or four inches. Patients presenting this condition cannot, correctly, be said to have fifteen strictures, since, in truth, they have a decidedly stenosed urethra with fifteen transverse thickened folds. The same remarks apply to cases in which we find several bands near the meatus or at any part down the canal. In somewhat exceptional cases Regions Nos. 1 and 3 are synchronously affected with stenosis, while Region No. 2 is intact. In such cases there may be separate strictures. To sum the matter up, therefore, we may say that exceptionally in gonorrhœal stenosis of the urethra the lesion consists of a firm, strongly-marked ring-like band, but that, as a general rule, a greater or less segment of the canal is involved, in which case there may be several constricting bands felt when sought for by means of instruments.

There is an erroneous impression entertained by many that gonorrhœa promptly causes stricture, and many young men are said to be thus affected who are then only suffering from chronic urethritis. As a broad general rule it may be stated that unless gonorrhœa is acquired in early youth true stricture is not common in persons under twenty-five, and even twenty-eight, years. In the following table of the 250 cases already spoken of, the dates at which patients presented themselves for relief of true strictures are given, as well as the number of patients:

From 10 to 15 years of age in	1 case.
" 15 " 20 " " " "	4 cases.
" 20 " 25 " " " "	25 "
" 25 " 30 " " " "	35 "
" 30 " 35 " " " "	49 "
" 35 " 40 " " " "	46 "
" 40 " 45 " " " "	31 "
" 45 " 50 " " " "	26 "
" 50 " 55 " " " "	13 "
" 55 " 60 " " " "	8 "
" 60 " 65 " " " "	8 "
" 65 " 76 " " " "	3 "
" 76 " 89 " " " "	1 case.

Total, 250 cases.

It will be seen that up to twenty-five years of age stricture is not, comparatively speaking, common; that between twenty-five and forty years of age the greatest number, nearly one-half, is recorded; and that a goodly number occurred between forty and fifty years. After the fiftieth year they grow progressively less numerous.

It is significant of the usual slowly-developing character of stricture that the greatest number of patients felt the necessity of relief between the twenty-fifth and fiftieth years.

**Varieties of Stricture.**—A number of terms are used in the description of the various forms of stricture. The thread-like form consists of one or more thin bands, usually seated just under the mucous membrane and not involving the submucosa deeply. This is also called the linear stricture. The diaphragmatic stricture consists of a thickened fold of mucous membrane with a centrally- or laterally-placed iris-like opening, small or large. The crescentic or bridle stricture is that form in which the mucous fold juts from about one-half of the lumen of the canal, either laterally or on the upper or lower wall. By the term annular stricture a more or less complete ring, narrow or broad, of the stenosed urethral canal is understood. When the resulting narrowed tube to the extent of one or more inches is irregular in its course, the case is called one of tortuous stricture.

The term fibrous stricture is applicable to some cases of ring-like contractions due to gonorrhœal inflammation. It is, however, usually applied to contractions which result from traumatisms, so that the terms fibrous and traumatic strictures are generally accepted as synonymous. When the urethra is converted into an irregular mass of fibrous tissue with much-contracted lumen, the condition, as it has already been described, is called inodular stricture.

The terms hard and soft stricture are frequently used, with much significance, in describing the degree of density of the urethral infiltration present.

An inflamed or hyperæmic condition of the mucous membrane, usually of short duration, sometimes occurs at the affected part in stricture of the urethra. In such cases the patients are said to have inflammatory strictures. They simply have strictures of greater or less calibre which, owing to various causes, such as alcoholic and sexual excesses, cold, horseback and bicycle riding, laborious work, and bodily strain, have for a time become impermeable by reason of the swelling of the mucous membrane. Such accidental conditions should not be dignified by such a formidable name as inflammatory stricture.

In some cases of stricture, particularly when seated in the subpubic curve, as a result of the causes just mentioned, and sometimes from the intemperate use of exploratory instruments, the compressor urethræ muscle, with perhaps the external vesical sphincter, becomes the seat of spasm and renders the urethra for a time impermeable. This condition is paraded at great length by some writers under the title of spasmodic stricture. It is simply an ephemeral complication, and is in no sense whatever a morbid entity. It is more common in some patients than in others.

While performing catheterization upon irritable subjects it has occasionally been observed by nearly every surgeon that the instrument is grasped and temporarily held by the urethral walls, even when the canal

is free from permanent obstruction. In this case the sound or catheter acts as a foreign body, and the irritation which it produces is followed by contraction in accordance with the familiar laws of reflex action.

In other cases the eccentric irritation is caused by laceration, abrasion, or a wound of the lining membrane, such as may ensue from the rough use of a catheter or other surgical instrument. This, of itself, may excite spasm, or the same may be induced by contact of urine with the raw surface.

Striking examples of urethral spasm are also met with as the result of irritation about the rectum excited by the presence of a tape-worm, ascarides, hemorrhoids, fissure of the anus, fecal accumulation, or by operations upon this part, especially the ligature of piles. Sir Benjamin Brodie met with a case of spasmodic stricture in which the spasm was intermittent, recurring every twenty-four or forty-eight hours, and which was finally cured by quinine after the failure of other means.

Among other causes of spasm are the presence of a stone in the bladder or urethra; organic stricture of this canal; long retention of the urine; digestive derangements; exposure to sudden changes of temperature; and mental emotion.

It is very important that we should clearly understand the scope and the limitation of the term "stricture of the urethra." To my mind, a canal may be said to be the seat of stricture when its calibre is reduced below that which Nature requires it to be in the performance of its functions. The œsophagus is an accommodating tube which will allow the easy passage of goodly-sized boluses of food, yet it can hardly be said to be the seat of stricture if it contracts on a walnut or an egg. The urethra also is a tube of much dilatability, but if, under extreme instrumentation, its lumen may be very greatly increased, it does not follow that the calibre thus registered is the normal one, any more than a bladder reaching up to the umbilicus from retained urine can be said to then present its normal capacity. We estimate the capacity of this viscus by the quantity of urine which it will hold without inconvenience or discomfort in health. In like manner we should estimate the calibre of the urethra. The question therefore arises, To what extent is the urethral canal dilated in urination? as this is the main function of the tube.<sup>1</sup> Upon this point I have made many investigations which can be stated in approximative terms. The plan of procedure is to make as sharp an estimate of the distention of the urethra as possible by means of the fingers while a patient is urinating, and after that distending the canal by a soft olivary bougie, and then forming estimates. In this way it can be determined that when the bladder is only about half filled the urethra is only distended to from 18 to 20 or to 22 French, and if there is very little urine present the distention is much less than 20 F. But when the viscus is very full the canal may be distended from 24 to 28 French. Now, when this distention is made greater by compressing the meatus and damming back the stream, the urethra bulges out considerably, and the patient immediately complains of uneasiness and pain. If, therefore, the function

<sup>1</sup> Repeated examinations on many subjects will show that there is much variation in the compactness, density, and elasticity of the corpus spongiosum. Consequently, conclusions can only be drawn from the study of cases in which this structure is soft, supple, and very extensible.



is normally performed when the stream of urine dilates the urethra to 24 or 28 French, it seems warrantable to assume that, on an average, the canal naturally has a calibre of about 28 or 30 F. Exceptionally we find instances where the calibre is a little above 30 F. It is a safe rule, therefore, to take 30 French as the average normal calibre of the urethra, with the understanding that there are exceptional cases, some of which are under and some over that average. My experience and studies upon this subject, which extend over more than twenty-seven years, have taught me that those patients do the best and enjoy the greatest immunity from remote troubles whose urethral strictures have been treated on the basis of a 30 F. calibre. And as antithesis I may add that I have seen, examined, and treated very many patients who have been (to my mind unwisely) subjected to over-distention and incision beyond 30 French, even to 40, who have been great sufferers in various ways, and who are constantly seeking relief from the surgeon. We cannot too prominently keep in mind Sir Henry Thompson's impressive admonition, "that the urethra is a very delicate and sensitive passage, never to be stretched beyond certain limits without incurring risks which are sometimes very grave."

**Development and Course of Stricture.**—The opinion is very generally held by surgeons that the development and course of stricture of the urethra are, as a rule, quite rapid. Many of the laity also partake of this view, and, as a result, the surgeon is frequently asked or importuned by men recovering from gonorrhœa to pass a sound in order to prevent stricture. Unfortunately, the surgeon often yields, and commonly to the sorrow of the patient.

It has occurred to me, seeing that we have little if any statistical details concerning the course and evolution of stricture of the urethra, to present here a table of 34 very carefully observed cases in which the duration of gonorrhœa is given, together with accurate measurements of the urethral canal. In none of these cases had instrumentation of any kind been adopted with a view of curing or relieving the urethral trouble:

*Table showing Evolution and Course of Stricture of the Urethra.*

Duration of gonorrhœa, 6 months, 1 case, urethra reduced at affected part to 15 French scale.							
"	"	1 year,	1 "	"	"	"	20 " "
"	"	13 months,	2 cases,	"	"	"	12 and 14 Fr. scale.
"	"	2 years,	1 case,	"	"	"	21 French scale.
"	"	3 "	2 cases,	"	"	"	5 and 20 Fr. scale.
"	"	4 "	4 "	"	"	"	{ 7 and 20 French, and filiform in 2 cases.
"	"	5 "	3 "	"	"	"	{ 10 and 18 French and filiform.
"	"	6 "	3 "	"	"	"	18 F. and filiform in 2.
"	"	7 "	2 "	"	"	"	15 F. and filiform.
"	"	8 to 9 "	2 "	"	"	"	8 and 13 French scale.
"	"	10 "	2 "	"	"	"	20 F. and filiform.
"	"	11 "	4 "	"	"	"	{ 8 and 10 F. and 2 fil- iform.
"	"	15 "	2 "	"	"	"	21 F. and filiform.
"	"	20 "	3 "	"	"	"	7, 9, and 10 F.
"	"	25 "	2 "	"	"	"	23 and filiform.

Total, 34 cases.

Thus we see that in 4 cases in from six to thirteen months the urethra has lost from rather less than a half to one-third of its normal calibre. These cases illustrate the rapid development of stricture-tissue. From

the second to the tenth year it will be seen that the development of stricture is somewhat rapid in some cases and quite slow in others, there being no uniformity of course whatever. Taking, for instance, the three cases in the fifth year, the figures are 10 and 18 French and filiform, while in the tenth year two cases are respectively 20 F. and filiform. Very much the same conditions exist up to the twentieth year, while in the two cases of twenty-five years we find the astonishing combination of 23 F. and filiform. We are warranted, therefore, in concluding that in its development stricture-formation may be quite rapid, but that, as a rule, it is moderately slow, and that in a goodly proportion of cases ten to twenty years may elapse, and yet the normal urethral calibre will only be reduced about one-third or even less. In the latter category belong the very slow cases.

**Symptoms of Stricture.**—In many cases patients suffering from chronic posterior urethritis, urethro-cystitis, prostatitis, and seminal vesiculitis reach the conclusion that they have stricture of the urethra, and I have known many cases in which physicians have concurred in this wrong diagnosis. In cases of stricture the affections above mentioned may co-exist, and may urgently require treatment. Consequently, the surgeon should be thoroughly familiar with all these morbid conditions, and should take them into consideration when treating the patient for stricture.

One of the earliest symptoms of stricture is a slight muco-purulent discharge, which may be observed only in the morning, as already described (see Chronic Anterior Urethritis), or it may, in exceptional cases, be noticed at intervals during the day. Usually the quantity of secretion is very scant, but exceptionally a good-sized drop may be expressed from the meatus once or twice a day, and perhaps oftener. A gleet discharge is an exceptional rather than a constant symptom of stricture. Jamin examined in Guyon's<sup>1</sup> service 61 cases of stricture, and found an appreciable discharge in only 4 cases. According to my experience, this proportion is too small, but the presence of a discharge in 10 per cent. of all cases would be a quite large average. There is, however, greater or less pus-formation in all cases of stricture, but it usually can only be seen by examining the urine. When stricture is uncomplicated with bladder inflammation, the urine is usually clear, but contains more or less threads and lumpy masses. (See p. 75.) In some quite old cases there may be some pus and much flat epithelium in a state of fatty degeneration.

Some patients quite early or at more remote periods after gonorrhœa complain of various subjective symptoms, such as slight uneasiness, a mild smarting, or a decidedly burning pain during micturition. In some cases increased frequency of urination, with pain at the beginning or end of the act, is experienced, due to coexistent chronic posterior urethritis. In other cases there is concomitant urethro-cystitis even quite early in the development of the stricture.

As a rule, I think that strictures in the pendulous urethra are sometimes attended with uneasy smarting and mildly burning sensations in the canal and at the end of the penis, while those in the subpubic canal are sometimes complicated with decidedly burning, even scalding, pains, particularly when the posterior urethra and bladder are also involved.

<sup>1</sup> *Op. cit.*, p. 416.

Another striking symptom may be complained of quite early—namely, a more frequent desire to make water. Great variation in this symptom is observed in the general run of cases. In some patients the intervals between urination may be three hours, and in others they may be much shorter, the desire coming every hour or even more frequently. This great frequency, however, is commonly seen in old cases complicated with cystitis. At first the desire is experienced during the day, but as the morbid condition increases the sufferer finds that he has to empty his bladder (or try to) several times during the night.

As the stenosis of the urethra increases the expulsive power of the bladder is materially impaired. Some patients state that the first intimation of a stricture known to them was the necessity for greater than usual force in voiding their urine. This symptom may in some cases be noticed quite early, but, as a general rule, the stricture is well advanced and the urethral lumen quite small before it is experienced. In general, the bladder gradually accommodates itself to the extra strain put upon it by means of the hypertrophy of its muscular fibres. Owing to this fact, a patient, particularly an obtuse or an insensitive or careless one, may not for several years appreciate the fact that there is an impediment to his stream, and that he uses more than ordinary expulsive power. In cases where the stricture forms rapidly this symptom may quite promptly be appreciated.

Synchronously with the diminished expulsive power of the bladder changes in the shape of the stream of urine may occur, and they usually make an impression on the patient's mind. In very many cases, though other symptoms have existed, this is the first one to attract the patient's attention. The shape of the stream depends largely on the conformation of the meatus. If this slit is wide, the urine may escape in two small streams—one with an upward tendency, while the lower one curves over and falls barely beyond the patient's toes. Then, again, in cases of large meatus a sputtering, broken, and short, or a flat, fan-like, stream may be observed. When the meatus is normal or quite small the stream may be thin and wiry, and perhaps a little twisted. Then, again, it may be very much twisted, forked, and corkscrew-like. In some cases the stream, though small, is quite strong and is well projected, while in others it is weak, hesitating, intermittent, and falls within a few inches of the patient's body, often wetting his clothes. In almost all well-advanced cases there is more or less dribbling of urine after micturition, owing to the inelasticity of the urethral walls and imperfect closure of the canal, and the diminished contractile power of the accelerator urinæ muscle and of the involuntary fibres of the corpus spongiosum. This symptom may be well marked in cases of stricture in the deep urethra, and it is usually very pronounced when the pendulous urethra is involved.

In more advanced cases patients may experience more or less difficulty in starting the stream of urine. They frequently make several attempts during one or more minutes before the urine appears, and then it frequently stops, and requires renewed efforts to start it again. As the stenosis grows more compact and the urethral canal is more and more contracted all these disturbances in urination may become more severe and constant. The patient experiences a constant desire to make water, and the act is attended with much pain. There is often pain in the bladder and



above the pubis, in the perineum, testes, vas deferens, and groins. In some cases patients complain of a constant dull aching or spasmodic pain in the glans penis, which may lead the surgeon to suspect stone in the bladder. The inflammation behind the stricture often affects the ejaculatory ducts, the verumontanum, and the seminal vesicles, and disturbs their function. As a result, there may be sexual inability or frequent emissions, pain on coitus, and ejaculation may be attended by a severe stabbing pain. In some cases the semen passes backward, and is later on discharged with the urine. In such instances the power of fecundation is lost.

In advanced cases, where great straining is necessary for the expulsion of the urine, prolapse of the rectum, hemorrhoids, and uneasy and painful sensations in the rectum, perhaps with spasm of its muscles, may result. In some cases the contents of the rectum are expelled with every attempt at urination. In these cases we frequently see that the penis is more or less congested, the blood remaining, occasionally from mild extravasation, in the areolæ of the corpora cavernosa and corpus spongiosum, and giving them an unusually firm consistence. Then, again, painful erections, like chordee, may occur, and as a result there may be mild hæmaturia.

Epididymitis and epididymo-orchitis of a low form and with slow and not painful invasion may sometimes occur rather late in the course of stricture. In somewhat exceptional cases these complications come on rapidly, with much pain.

In old men with firm stricture hernia may be produced by the great efforts in straining. In these old cases it is not uncommon to observe a more or less profuse muco-purulent discharge, either transparent or opaque.

Retention of urine is a quite common complication of stricture of the urethra, particularly in cases in which the stenosis is in Region No. 1. It is observed less frequently when Regions Nos. 2 and 3 are the seat of contraction. In some cases this complication is the first warning indication of the presence of stricture.

Some patients seem particularly susceptible to retention of urine, which seizes them at shorter or longer intervals for years. Others, again, in spite of many and varied hygienic and sexual transgressions, seem to be free from this accident. In still other cases during a period of twenty-five or more years retention may occur but once or twice, even though the patient leads a free-and-easy life. Retention is, as has been stated, due to hyperæmia of the mucous membrane and spasm of the compressor urethræ muscle.

In some old cases of very tight stricture the urine constantly dribbles from the meatus, and patients thus afflicted are said to suffer from incontinence. In this condition there is a constantly distended bladder, and the external sphincter vesicæ and compressor urethræ muscle, having lost much of their tonicity, possess but feeble contractile power, and as a result the urine dribbles away. In such cases the genitals and thighs may become much excoriated, the under-linen and trousers are constantly soaked, and the patient carries with him an offensive odor of decomposed urine. In this condition there is usually sufficient overflow to relieve the patient of the imperative desire to urinate which is so constant in retention.

**Pathological Complications in the Course of Stricture.**—As a result of advanced stricture the urethra posterior to it becomes more or less dilated, and its walls attenuated in spots or patches by the retarded stream of urine forced forward by bladder-contraction. This dilatation involves the membranous and prostatic urethra, and it may be so extensive that the fore finger may be readily admitted into the canal. In some cases a decided pouch is produced. The mucosa and its underlying connective-tissue layer are much thickened, the prostatic and ejaculatory ducts are dilated, and the floor of the urethra is traversed with longitudinal and irregular septa, between which are little pouches of dilatation. A notable instance of extreme dilatation of the urethra behind a stricture is presented in a case reported by Sir B. Brodie, in which, on urination, a fluctuating tumor as large as an orange was felt in the perineum.

Superficial and deep ulcerations very frequently occur behind old strictures. In some cases large and ragged excavations are produced. Concretions are not infrequently found imbedded in the urethral mucous membrane.

Abscesses and fistulæ sometimes develop in the neighborhood of strictures. They may begin in inflamed follicles or in small ulcerated spots which allow the escape of a few drops of urine into the surrounding connective tissue. They then burrow in various directions, and form hard, circumscribed masses on the external surface, which soften and give rise to fistulæ, of which many may open on the perineum, the scrotum, the nates and thighs, and upon the abdomen as high up as the umbilicus. These fistulæ usually have but one opening into the urethra. As they grow older their walls become covered with a layer of pavement epithelium, which in many cases must be curetted away before healing can be brought about. Calcareous matter may be deposited in these fistulæ.

Abscess of the prostate occurs in some cases of very old stricture, particularly those which have been subjected to much instrumentation. (See Fig. 119.) It discharges into the urethra, the perineum, or the rectum. The muscular layers of the bladder become much hypertrophied, and at the same time there is great increase in its connective tissue. As a result, the walls of the bladder are increased to five or six times their normal thickness, measuring in some cases a full inch. (See Fig. 119.) The mucous membrane then presents prominent ridges which resemble the columnæ carneæ of the heart's cavities. Between these ridges, owing to the violent expulsive efforts of the bladder, thinned spaces or sacculi sometimes form, which, when the bladder is full, jut out like pouches which sometimes become of very large size, even larger than the bladder itself, and frequently calculi form in them.

In some cases the sac or pouch becomes thinned, perhaps from ulceration, and the bladder being over-distended with urine, it gives way at this part. The urine escapes into the peritoneal cavity or into the pelvic connective tissue behind the triangular ligament. When this occurs the bladder-tumor previously felt, extending toward the umbilicus, ceases to be salient. In these cases patients usually die from shock, particularly when the rupture has been into the peritoneal cavity.

Rupture of the bladder resulting from stricture of the urethra is of very rare occurrence. In a series of 67 cases collected from various sources by Dr. Stephen Smith,<sup>1</sup> in only 4 was stricture of the urethra

<sup>1</sup> *N. Y. Journal of Medicine*, March, 1851.

noted as the cause. To these Gouley<sup>1</sup> adds the details of 4 cases, 2 of which were personal.

As the bladder becomes more affected certain changes take place in the urine. At first it is of acid reaction and slightly cloudy from the presence of pus. Then, owing to its partial retention in the bladder, it becomes more turbid, and finally, from decomposition, it becomes ammoniacal and emits a penetrating fetid odor. It then has a very cloudy appearance and contains much ropy mucus. Under these circumstances blood, usually in small quantities, may escape from the urethral walls, and, mingling with the urine, will give it a dirty-brown color.

The morbid changes which are seen in the urethra and bladder extend to the ureters and kidneys. The ureters become much dilated, so that the fore finger or thumb may be passed into them, and ever greater dilatation than this has been observed. The pelves, infundibula, and calices of the kidney may be distended and the seat of chronic inflammation. With the advent of advanced bladder symptoms, particularly when the ureters and kidneys are affected, a marked condition of ill-health supervenes. These patients become sallow, have much digestive disturbance, and rapidly lose weight. They become chronic invalids, complain constantly, are anxious and careworn, and suffer from pain in the back and loins. They not infrequently have symptoms similar to fever and ague. In an advanced case every few minutes the patient has a desire to pass his urine. He then strains violently, writhes with intense pain and agony, and breaks out in a cold sweat, and, as a result, he is perhaps able to expel only a few drops of putrid, scalding urine. These sufferings, which make the patient a pitiable object, have much to do with hastening death. In some cases mild or severe urethral fever follows every attempt, no matter how gentle, at instrumentation of the urethra.

Pains at such remote parts as the heel and the sole of the foot have been complained of, as well as neuralgic affections of the testes, abdomen, and thighs.

In some very bad cases the patient continually loses ground, and finally dies of exhaustion. In other cases a low grade of urinary fever, with marked evidences of malnutrition, tortures the patient until death relieves him.

**EXTRAVASATION OF URINE.**—As a result of violent straining efforts in some cases of very tight stricture the urethral walls give way and the urine then gushes into the surrounding or nearby connective tissue.

Rupture of the urethra may occur (1) in the course of the penis as far back as the peno-scrotal angle. It may occur (2) in the bulbous part of the urethra between the angle and the triangular ligament. It may rupture (3) in its membranous portion, between the layers of the triangular ligament, and (4) behind the triangular ligament, either at the junction of the membranous and prostatic urethra or in the prostatic urethra itself. The direction of the extravasation varies according to the part of the urethra which is the seat of rupture.

Rupture of the pendulous urethra which is rather rare, causes much swelling of the organ. The fibrous covering which invests the corpus spongiosum, which consists of fascia derived from the suspensory ligament of the penis and from the deep perineal fascia, may remain intact, and

<sup>1</sup> *Diseases of the Urinary Organs*, New York, 1873, p. 251.



then the swelling pushes down to the root of the penis and the scrotum; or this fibrous investment may be ruptured, in which case there is much extravasation into the connective tissue of the penis itself, and also into the scrotal tissues.

When rupture takes place anterior to the triangular ligament the urine is prevented by the dense stricture from escaping into the pelvic cavity. It cannot diffuse itself down the thighs, because the deep perineal fascia is firmly adherent to the ischio-pubic line; consequently, it takes the easy course and ascends up the hypogastrium between the pubic spine and the symphysis. The extravasation may in severe cases reach as far up as the umbilicus. When the rupture takes place in the membranous urethra the urine is confined between the two layers of the triangular ligament. In these cases suppuration and sloughing are prone to occur, and then the urine will escape in the direction which the newly-formed sinus follows, generally backward into the pelvis, and rarely forward toward the perineum and scrotum.

If the extravasation occurs behind the posterior layer of the triangular ligament, the urine may gush or leak out down the recto-vesical space and point in the perineum anterior to or at the sides of the anus; or it may ascend through the pelvic fascia near the pubo-prostatic ligament, and then diffuse itself through the pelvic connective tissue.

The **symptoms** of extravasation of urine are generally well marked. Extravasations anterior to the triangular ligament usually present such marked features that they are promptly recognized. Extravasations behind the triangular ligament may be attended by marked symptoms when the gush of urine is prompt and copious. In some cases, however, the extravasation takes place quite slowly, and then the symptoms may not be well marked and appreciated for a day or more.

Usually a patient suffering from extravasation states that he felt something give way, and experienced a sensation of relief, but he wonders why his urine does not flow away normally. Very soon systemic symptoms set in. The patient complains of great weakness and depression, nausea, fever, and perhaps chills. Then it is noticed that the scrotum is more or less, even enormously, distended, and that the swelling extends up the hypogastrium, perhaps to the umbilical region or laterally in the iliac region. The skin then becomes tense and erysipelatous, and to the finger-tips gives the sensation of emphysematous crackling. The bright-red hue rapidly becomes dusky, purplish, and even gangrenous. Sloughs of skin may come away, and in some cases the whole scrotum is destroyed, leaving the testicles completely bare.

When the extravasation has been anterior to the peno-scrotal angle, it may occur into the meshes of the corpus spongiosum, and then push forward to the glans penis, where it forms a black gangrenous spot. This is a symptom of very bad omen, since cases presenting it usually die.

The **symptoms** of rupture into the membranous urethra may at first be mild, but they grow worse as the urine tunnels for itself a passage and allows of copious extravasation. In cases of rupture behind the triangular ligament the systemic symptoms come on more or less promptly, and are correspondingly grave.

Unless relieved by operation, patients suffering from extravasation go on from bad to worse. Nausea, vomiting, total anorexia, mild delirium,

high fever, and a small wiry pulse are the chief symptoms. The patient becomes more feeble, and has a dry, parched tongue, his muttering delirium increases, and he perishes in coma from uræmia and septicæmia.

It is very probable that the condition of the urine has much to do with the course and gravity of extravasation. If this fluid is in an aseptic condition, it is much less destructive (and it is claimed by some not at all destructive) to the tissues. Consequently, necrosis and its concomitant, septicæmia, may not occur, particularly if prompt relief is given by the knife. Unfortunately, in the majority of cases in which the urethra is the seat of tight stricture its walls behind it are much damaged and the bladder is deeply affected. The urine as a result is largely mixed with pus and is poisonous to tissues with which it may come in contact.

**Causes of Stricture.**—In the vast majority of cases gonorrhœa is the cause of urethral stricture. It may also result from the healing of chancres and chancroids and of phagedæna at the meatus. In some cases injury to the urethra causes strictures which are called traumatic.

Masturbation has been claimed to cause stricture. This habit causes congestion and moderate submucous cell-infiltration in the prostatic urethra, in which strictures other than traumatic are never found. It is perhaps possible that this inflammation of the prostatic urethra may extend forward and involve the bulb, and thus produce stricture, but we have no scientific evidence whatever upon the subject. It sometimes happens, strange to say, that men who are suffering with stricture will absolutely deny that they ever had gonorrhœa. In these cases the habit of masturbation can usually be ascertained, and then the neophyte may hit upon that as the cause of the urethral coarctation.

Congenital stricture is not common, and is found at and near the meatus.

I saw many years ago a case of stricture of the urethra due to a peculiar condition of the mucous membrane of the glans and involving the mucous membrane of the fossa navicularis. The membrane was transformed into a pearly-white, shining, intensely dense tissue, which began above the corona glandis, covered the glans like a tightly-fitting cap, and extended into the urethra, uniformly narrowing its lumen to No. 6 French for the distance of an inch. I have since seen that J. Greig Smith<sup>1</sup> has reported two such cases. The first was that of a man, thirty-four years old, who had never suffered from any venereal lesion or injury of the penis. At the end of the penis a semi-cartilaginous tissue so occluded the urethra that the urine could only be expelled drop by drop. The second case was that of a boy, aged eighteen, also without any history of venereal disease or local injury. There was the same pale, hard, contracted condition of the mucous membrane of the glans and fossa navicularis, which presented the appearance of a true sclerosis. Smith thinks this condition is allied to scleroderma of the skin.

In this connection it is interesting to note that Minges and McCarthy<sup>2</sup> have reported a case of stricture at the meatus three-quarters of an inch long to 12 F., caused by the development of keloid. Incision, electrol-

<sup>1</sup> "An Undescribed Form of Stricture at the Orifice of the Male Urethra," *Bristol Med.-Chir. Journal*, Sept., 1884, pp. 154 et seq.

<sup>2</sup> "A Case of Keloid of the Male Urethra," *Medical and Surgical Reporter*, Aug. 27, 1892.

ysis, and the passage of sounds seemed to aggravate the morbid process, so that a mass of dense tissue was formed around the urethra so deeply that it was necessary to extirpate two and a half inches of the canal with some of the surrounding healthy tissue. This radical procedure failed to stop the progress of the infiltration, and it became necessary to amputate the whole penis. The microscope showed clearly that the morbid tissue consisted of true keloid.

Thus we have two very rare forms of stricture of the urethra which are not very, if at all, amenable to treatment—the one a sclerosis resembling scleroderma, and the other keloid of the male urethra. My experience with my own case showed me very clearly that fairly good results followed gentle dilatation, which just kept the urethra patulous, and that active and aggressive dilatation caused pain and a further increase of the trouble.

The long continuance of gonorrhœa is the essential cause of stricture rather than the severity of the attack.

In somewhat rare cases we learn from a patient having a tight stricture that he had but one attack of gonorrhœa, or perhaps two, and that the disease did not persist very long. In the majority of cases of stricture there is a history of repeated recrudescences of an original gonorrhœa or a greater or less number of new infections. As a result, the small cell-infiltration goes on increasing, and from it fibrous tissue is developed which forms the stricture. In old times breaking the cord when the seat of chordee, which means rupture of the urethra, was, it seems, a somewhat frequent cause of stricture, but to-day such cases are of the greatest rarity.

In the minds of the laity injections play an important part in the production of urethral stricture. This view has no foundation in fact, since mild injections are productive of some good, and strong and severe ones are so painful in their effects that they are soon given up.

**Exploration of the Urethra.**—For the diagnosis of stricture we employ, in the main, bougies of various kinds which are flexible, and sounds which are made of solid metal.

For simplicity and precision in use these instruments are made in sizes which increase from small to quite large ones, and are graduated according to their diameters, which are clearly portrayed by certain scales used for measurement. The most extensively-used scale for urethral instruments is the French one, called the *filière Charrière*. The English scale is also used by many surgeons, but it has its drawbacks. Besides these scales there are others which, since they do not possess any marked advantages in their favor, and have some disadvantages, need not be considered here.

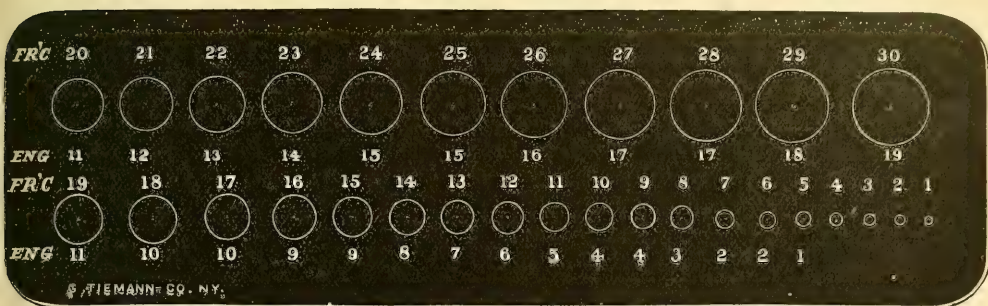
The French scale progresses by steps of one-third of a millimetre in diameter; thus, No. 1 represents an instrument one-third of a millimetre in diameter, No. 2, two-thirds, and No. 3, three-thirds or one millimetre. In this manner the scale progresses up to No. 30, which has a diameter of ten millimetres, there being a bougie for each number. Thus it will be seen that a bougie No. 6 French scale has a diameter of two millimetres, No. 9 of three millimetres, No. 12 of four, No. 18 of six, No. 24 of eight, and No. 30 of ten millimetres. The sizes of intermediate numbers can thus be readily computed.

In Fig. 92 both French and English scales are given, and by study-



ing them a clear idea of the greater or less progressive uniformity in size may be obtained :

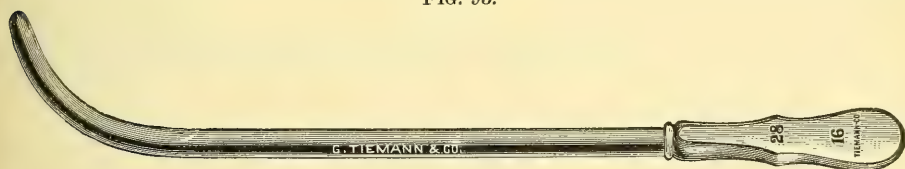
FIG. 92.



French and English scales.

*Sounds.*—These instruments are made of nickel-plated steel, and their surface should be so smooth that they will readily glide over the urethral walls. The best all-round instruments are those having what is known as Thompson's short curve at their distal portion. They should be conical at their point, which, while being very round and smooth, is three sizes smaller than the shaft of the instrument. It is very desirable that the handle of the sound should be rather thin, tolerably light, and somewhat wedge-shaped. Fig. 93 gives a very clear idea of an exceedingly grace-

FIG. 93.



Conical steel sound.

ful and useful sound, which can be used with much delicacy of touch. Sounds with heavy, clumsy handles, insufficiently nickel-plated, dull of surface, and not very smooth should be avoided.

There is a tendency among some to-day to carry the antiseptic care of sounds to an extreme degree of refinement. It is unnecessary to immerse these instruments in strong antiseptic solutions, which will tarnish them and render their introduction rather more difficult than usual. They should be well washed with soap and water and carefully dried with a clean towel before and after each introduction. With this ordinary care one need never fear carrying an extraneous infective material into the urethra.

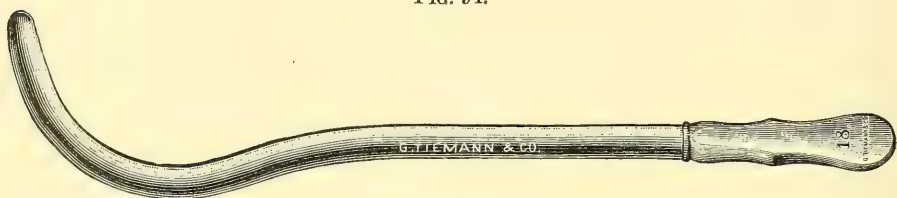
A full set of sounds according to the English scale begins at No. 6, which corresponds to No. 12 French, and ends at No. 18, which is the equivalent of 30 F. Though sounds are found in the market as large as 40 French, it will be very seldom necessary for the conservative surgeon to employ these instruments of a larger size, at the very utmost, than 34 F.

As a rule, steel sounds are used in practice in numbers between 11 and 12 English, corresponding to 20 and 21 French, and 18 English or 30 French. When an instrument is needed smaller than 20 F., it is well to use the olivary bougies. On the other hand, when an instrument larger than 20 or 21 F. or 11 or 12 English is needed, it is better, in general, to use the steel sound.

There has been a tendency developed of late years to shorten the length of the curve of sounds—first, by those who taught that nearly all urethral troubles were seated in the anterior urethra, and, second, by those who are possessed of a deeply-rooted dread of producing infection and inflammation in the posterior urethra. Without now discussing this subject fully, it may briefly be stated that the opinions of the persons in the first category were based entirely upon false views of pathology, and that the fears of the second class were undoubtedly caused by the results of the careless and indiscriminate passage of sounds.

A very useful and desirable sound is that known as Benequé's. It has a long double curve, corresponding nearly to the two curves of the urethra when the penis is not elevated against the abdomen. It is really of the same shape that a flexible bougie assumes when introduced into the bladder and left to itself. Within certain restrictions and limitations, to be detailed a little later on, this sound will be found of much service in a

FIG. 94.



Benequé's sound.

number of cases. It is only necessary to have six of Benequé's sounds, beginning with No. 14 E. or 23 F., and ending with 20 E. or 34 F.

Straight steel sounds, of the sizes from 20 to 30 F., are sometimes very useful in cases of stricture in the pendulous urethra. (See p. 176, Fig. 66.)

*Olivary Bougies.*—These bougies are so useful that the surgeon should always have a goodly supply at hand. Formerly French bougies were the best in use, but of late years excellent ones have been manufactured in this country.<sup>1</sup> The olivary bougie is the one best fitted for general purposes, and the blunt ones are seldom used. In Fig. 95 is well shown

FIG. 95.



Flexible olivary bougie.

an ideal olivary bougie. The surgeon should exercise great care in the selection of these instruments, and should reject those that are in any way

<sup>1</sup> By the J. E. Lee Co., Conshohocken, Pa.

faulty. The following are the particular points of excellence necessary in these bougies: The whole instrument should have a smooth, shining surface, either black or yellow, and there should be no cracks whatever on it. The olivary point should be rounded and smooth, and should taper off gracefully into the neck, which should very gradually increase in size until the shaft is reached, as is well shown in Fig. 95. The neck should be very supple, and the whole instrument should be so flexible that on introduction it will easily and almost imperceptibly follow the course of the urethra without any discomfort to the patient. As a rule, the olivary end should be about seven sizes smaller than the shaft of the bougie, and the neck at the base of the olive point should have a diameter of about one-half of that of the olivary expansion. When these requirements are fulfilled the instrument is quite gradually tapering, and will produce much benefit in the process of dilatation of the urethra. All bougies with imperfect olivary ends should be rejected. These seemingly minor points are worthy of much attention.

The surgeon should provide himself liberally with these instruments, having three or four at least of each size. The most useful sizes begin at No. 6 F. and end about No. 22 or 24 F. It will be found, as a rule, that bougies of sizes above No. 22 or 24 French are liable, even when great care is used in their introduction, owing to their quite large calibre and their comparatively thin and compressible walls, to become cracked or more or less broken from two to four inches from their distal portion. As a rule, therefore, these instruments may be used for dilatation or exploration in sizes as high as 20 to 24 French. Beyond these limits much better results will be obtained from the use of steel sounds.

These bougies should be kept (few in number) in compartments in which, in hot weather, powdered French chalk may be placed to prevent the gumming of opposing surfaces. Before and after use, like sounds, olivary bougies should be carefully washed and dried. Immersion in strong antiseptic solutions causes the varnished surface of these instruments to tarnish and crack, in which condition they are wholly unfit for use.

*Filiform Bougies.*—Very attenuated, delicate bougies, called filiforms, are of great service in the diagnosis and treatment of tight strictures. The two principal forms are those of French manufacture and the whalebone bougies. French filiform bougies are very soft and flexible, and are of much use in cases where the stricture does not hug tightly. In examining tight strictures they soon become twisted and cracked, and then it is necessary to discard them.

For general use Gouley's whalebone filiform bougies are most serviceable. These little exploratory instruments have, as a rule, a diameter of two-thirds of one millimetre, but some of them are of larger calibre. Of whalebone filiform bougies there are two kinds, the short and the long. The short bougies are about twelve inches long, while the long ones are twenty to twenty-five inches long. The short instruments are employed for purposes of diagnosis, while the long ones are used as conductors for sounds or catheters through strictured tissues.

The shafts of these instruments should be perfectly smooth, and they should never be used until they have been carefully examined, for they, by use, are apt to chip and crack or become frayed. Their points are



usually tapering, and they end in a minute bulb. These bougies may be straight or they may have eccentric and twisted points. By soaking them in hot water they can be twisted into any desired shape, spiral, zig-

FIG. 96.



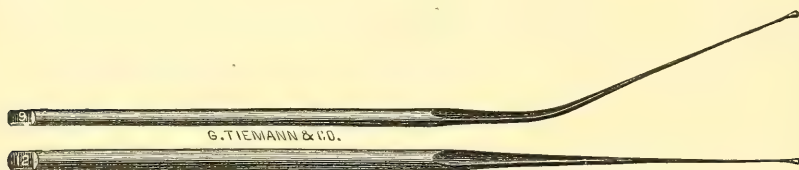
Gouley's whalebone filiform bougies.

zag, and bent at any angle. After soaking in hot water and bending them the shape may be made stable by plunging them into cold water.

Whalebone filiform bougies should be kept in tin cases to ensure them from the attacks of certain grubs or worms which destroy them. As they grow old they may become brittle, consequently it is well to oil them occasionally.

Whalebone bougies with tapering filiform ends, increasing quite abruptly up to goodly-sized 10 to 13 F. shafts, are sometimes of very great service in preparing the way for gradual dilatation, for a small retention catheter, or for the introduction of a staff for internal or external urethrotomy. These bougies are known as Banks's whalebone bougies. (See Fig. 97.)

FIG. 97.



Banks's whalebone bougies.

What are known as Harrison's dilators or whips are often very useful for quite rapid dilatation at one *séance*. These bougies are twenty-four inches long, and are straight for thirteen or fourteen inches, then they taper down gradually to the tip. They range in sizes between 10 and 20 French, and are very soft and supple. Six of them form a set, the smallest of which is filiform at its tip.

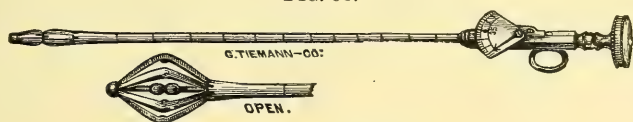
The French and English filiform bougies are generally armed with screw tips, which permit of their adjustment to catheters and to the staffs of urethrotomes, to which they serve as guides to the bladder. These bougies with screw tips are particularly frail at their point of junction, and as a result can scarcely ever be used more than once or twice. The English bougies are rather more brittle than the French ones, but when used carefully, owing to their stability, they traverse strictures with more uniform success than the French ones do.

*Bougies à Boule.*—The acorn-pointed bougies, or *bougies à boule*, have

already been spoken of. (See p. 175, Fig. 75.) These instruments are indispensable for the diagnosis of stricture, since they allow us to clearly detect and define hyperplastic and inflamed points and strictures in the anterior urethra. They are rarely used in the posterior urethra. The soft, flexible *bougies à boule* should be the instruments of choice. These bougies are also made of nickel-plated copper, but they are stiff and unwieldy, and their use is liable to cause pain and uneasiness to the patient. I have never seen the necessity of using these bougies.

*The Urethrometer.*—Since the meatus is usually the smallest part of the urethra and varies very much in its calibre, it may not allow the introduction of any of the instruments thus far mentioned of sufficient size to thoroughly explore the canal and especially to detect contractions. An instrument which could be inserted through a narrow meatus and then be dilated within the urethra, with an index at its distal extremity showing the amount of its dilatation, was therefore a desideratum. This want has been supplied by the ingeniously contrived urethrometer of Dr. Otis (Fig. 98), who describes it as follows: "It consists of a small, straight cannula,

FIG. 98.



Otis's urethrometer.

size No. 8 French, terminating in a series of short metallic arms hinged upon the cannula and upon each other. At the distal extremity where they unite a fine rod, running through the cannula, is inserted. This rod (which is worked by a stationary screw at the handle of the instrument), when retracted, expands the arms into a bulb-like shape, ten millimetres in circumference when closed, and capable of expansion up to 40 French scale. A thin rubber stall drawn over the end of the closed instrument protects the urethra from injury and prevents the access of the urethral secretions to the interior of the instrument. When introduced into the urethra and expanded up to a point which is recognized by the patient as filling it completely—and yet easily moving back and forth—the index at the handle then shows the normal circumference of the urethra under examination. In withdrawing the instrument contractions at any point may be exactly measured, and any want of correspondence between the calibre of the canal and the external orifice be readily appreciated. Among the advantages claimed for this instrument are—1, its capacity to measure the size of the urethra and to ascertain the locality and size of any strictures present, *without reference to the size of the meatus*; 2, it enables the surgeon to complete the examination of several strictures by a single introduction of the instrument."

For cases in which the meatus is rather small this instrument may be of much service, provided its bulb is not screwed up beyond 30, or at the most 32, F. Within these sharp limitations the instrument may be employed. But beyond these limits it is one of the most mischievous, and even dangerous, instruments in use. It can be said without fear of contradiction, and in the utmost spirit of fairness and truth, that there is not

a man alive who cannot be convicted of having one or more strictures of the urethra of large calibre if he is examined by means of this instrument and it is screwed up to 36 or 40 F. I have personally seen scores of men who have been falsely pronounced to have strictures of large calibre based upon examinations made with this instrument. These points will be further discussed a little later on.

*Catheters.*—Catheters are tubular instruments used to draw off urine from the bladder. They are made of soft rubber, of lisle thread with gum-elastic coating, and of silver.

The soft-rubber (also called Nélaton's) catheters are instruments which have a wide range of usefulness. They may be found in sizes varying from 10 to 30 French, but, as a rule, the intermediate sizes are by far the most useful. Soft-rubber catheters should be made of flexible and

FIG. 99.



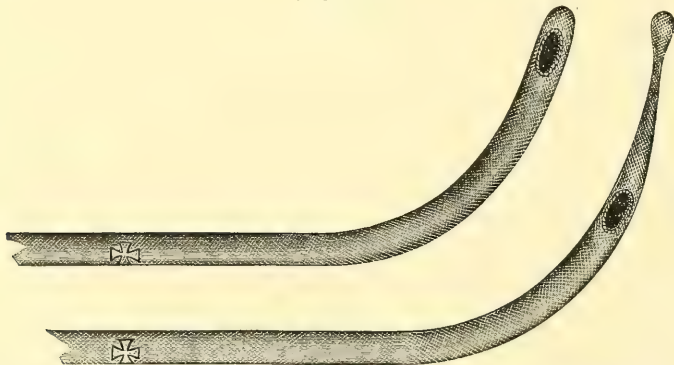
Velvet-eye catheter.

extensible material, and should be soft and supple, and not brittle and liable to crack and break. It is always well to avoid inferior grades of soft catheters.

The most commonly used catheter now is Tiemann's velvet-eye catheter, which is soft and smooth and provided with an eye which is so depressed and rounded off that it causes no friction or uneasiness when introduced.

Gum-elastic catheters have more firmness than the soft ones, and consequently can be passed through urethræ the seat of more or less contraction or inflammatory hyperplasia. These catheters may have a uniform calibre with blunt and rounded ends, or they may have the shape of olivary bougies. They may be straight or they may be curved.

FIG. 100.



Curved blunt gum-elastic catheter and olivary catheter, with curve for prostatic obstruction.

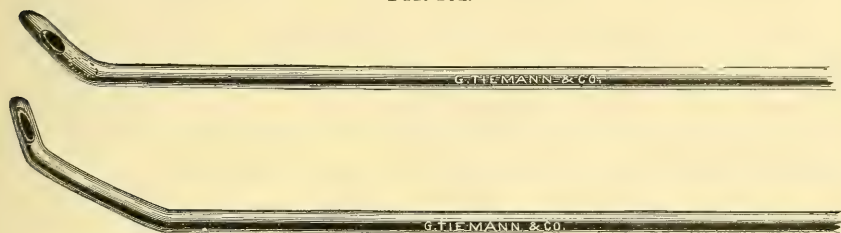
These catheters are now made of excellent quality and design in this country.



The curved olivary catheter shown in Fig. 100 is an excellent one for use in some cases of old prostatics.

What are known as Mercier's coudé (or elbowed) and bi-coudé (or double-elbowed) catheters, made of gum elastic and lisle thread, sometimes

FIG. 101.



Mercier's coudé and bi-coudé catheters.

prove brilliantly useful in relieving the full bladders, particularly of fat old men, whose bulb of the urethra is flabby and dependent. The surgeon should always have these instruments at hand. Many of the coudé catheters as sold in the shops are faulty, for the reason that the curved portion is too short. In Fig. 101 the correct angle and proper length of this curve of the catheter are well shown.

Of late years silver catheters are quite seldom used, owing to the perfection attained in the manufacture of the soft-rubber and gum-elastic instruments. They may be found in pocket cases in shapes suitable for males and females, young and old, but they will commonly be used only when the surgeon has not the softer instruments at hand. A soft-rubber or a blunt gum-elastic catheter cut off to a length of five or six inches is equally as useful for the female bladder as a regular female catheter. In some rare cases of prostatic hypertrophy, particularly of the lateral lobes, and also of the median lobe, silver catheters with a very long curve may reach the bladder when the surgeon has failed with the long-curve gum-elastic catheter and with Mercier's catheters. It is well, therefore, to be provided with one or two silver prostatic catheters.

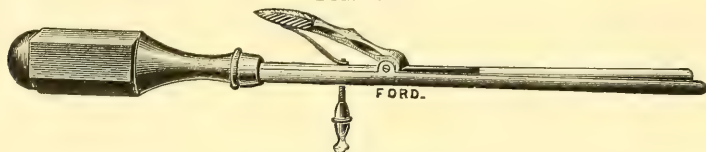
*Instruments for Incision and Rupture of Stricture.*—There are so many instruments before the profession for the treatment of stricture by incision, by dilatation and incision, and by divulsion that an inexperienced person becomes bewildered and is incapable of making a judicious selection. Though there are many useful instruments in the market, there are very many which are of limited use, others that are decidedly dangerous, and still others that are of no use whatever except in the hands of the men who invented them. There is one very serious trouble which is inherent in most stricture instruments, which occurs in this way: The surgeon has a stricture case for which he devises a more or less useful instrument, which in his hands works well, and on this basis he then exploits this instrument for strictures in general. An attentive reading of most of the articles on stricture by gentlemen of an inventive turn of mind will very clearly show that, having invented his urethral instrument, he proceeds to indiscriminately treat all cases by it, and reports them by the score, and always claims conspicuously brilliant results and cures. The trouble

is that cases in general are made to fit certain instruments, and not the instruments to fit the cases.

The young surgeon should always begin cautiously by the purchase of only a few instruments, and then he may increase his armamentarium in accord with his growing experience. This much certainly may be said: that surgeons who have large hospital services can do good and effective work with a few suitable instruments which have a considerable field of usefulness.

For strictures near the meatus Civiale's concealed bistoury (bistouri caché) may be used if the surgeon has one handy. In general, however, the ordinary straight blunt-pointed bistoury will answer every purpose to the surgeon's satisfaction.

FIG. 102.



Civiale's concealed bistoury.

One of the most useful and simple instruments for tight strictures in the pendulous urethra is Dr. Fluhrer's modification of Maisonneuve's urethrotome. This consists of a staff or conductor nine and a half inches long of a calibre of 12 F., grooved on its upper surface and slightly curved at its distal end, which is tunnelled for one-eighth of an inch. The triangular blade with a blunt apex is seated at the end of the stylet and is provided with a handle. The whalebone guide having been passed down the urethra and into the bladder if possible, the grooved staff is slid over it as far as the peno-scrotal angle, and then the knife is slowly and firmly pushed down, the penis being held straight and tense. By this urethrotome the urethra may be incised to 18 or 24 F.

For stricture of the urethra which will allow the passage of a bougie 15 F. the aseptic urethrotome of Dr. Gerster is often very useful. "This instrument is composed of five detachable parts—three steel rods and two screws. One of the rods is provided with a laterally-grooved bulb of small size (1), acting on a wedge, which by the aid of a stout thumbscrew serves to spring apart a pair of congruent steel blades (2). The amount of separation of the steel blades (somewhat resembling a pair of old-fashioned draper's shears), reduced to millimetres corresponding to the urethral calibre, is indicated by a dial placed above the ring that serves for the fixation of the instrument. The correct adjustment of the thumbscrew is secured by a small checkscrew which represents the proximal end of the urethrotome. The third rod, a small knife hidden in the slightly-curved beak of the instrument, can be withdrawn so as to correspond to the place of widest separation of the shear-blades."

The mode of operation is as follows: The closed instrument, lubricated with glycerin, is passed well beyond the strictures, and then the shear-blades are separated by means of the thumbscrew to the desired calibre. The instrument is then drawn forward until resistance is felt from the stricture. The hidden knife is then drawn into position, and the whole instrument, being firmly grasped, is steadily pulled forward. Thus the

stricture is gradually dilated so as to offer a favorable degree of tension for the action of the knife. This instrument should not be used for very tight and dense strictures.

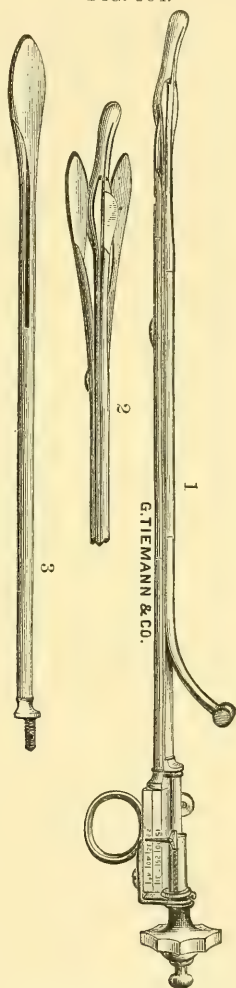
For the moderate or limited incision of bands or broader coarctations of the pendulous urethra, which will admit of instruments as large as 16

FIG. 103.



Maisonneuve-Fluhrer urethrotome.

FIG. 104.



Gerster's aseptic urethrotome.

or 17 F., Civiale's urethrotome will sometimes prove very useful. This instrument has a terminal bulb in which the blade is concealed, but which can be readily drawn out by pressing on a spring near the handle. A glance at Fig. 105 will reveal its construction.

When used with great caution in a restricted number of very carefully selected cases, Otis's dilating urethrotome may be of service, particularly when there is a bona-fide stricture of a calibre of from 16 to 20 F. in the pendulous urethra.



This instrument consists of a pair of steel shafts connected together by short pivoted bars, on the plan of an ordinary parallel ruler. They are separated by means of a screw at the handle, near which is a dial indicating the extent of their divergence. The upper bar of the instrument is traversed by a urethrotome, terminating in a thin, narrow spring blade,

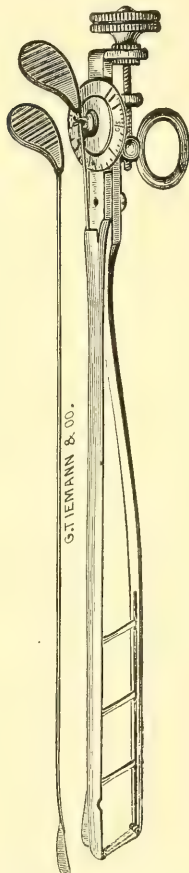
FIG. 107.

FIG. 105.

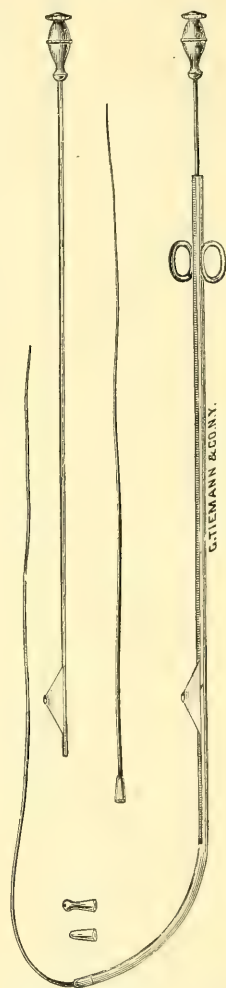


Civiale's urethrotome.

FIG. 106.



Otis's dilating urethrotome.



Maisonneuve's urethrotome.

which, when at the extremity of the groove in which it runs, is concealed in a slot. The instrument, with its contained urethrotome, having been passed down beyond the site of the stricture and dilated until the stricture is made tense, the handle of the urethrotome is withdrawn, causing the blade to rise from the depression in which it was concealed, and the stricture is divided upon its upper wall from behind forward. The advantages claimed by its inventor for this instrument are—that it attacks

a tense instead of a flaccid stricture; that its incisions are made at a predetermined point, depth, and extent; that it is especially adapted to strictures of large calibre; and that it combines great strength with ease of manipulation.

For certain cases of tight stricture in the urethra at the peno-scrotal angle, and as far back as the bulbo-membranous junction, Maisonneuve's urethrotome is sometimes very serviceable. This instrument is far superior to all other curved urethrotomes. Its use, however, is restricted to a certain class of cases.

Maisonneuve's urethrotome consists simply of a grooved staff, which need not exceed No. 7 of the French catheter scale (three and one-third millimetres in diameter), provided at its extremity with a screw-point to which is attached a filiform bougie. The blades, intended to slide in the groove and to divide the stricture, are triangular in shape, sharpened before and behind, but blunt at the apex, so that they may pass over the sound urethral mucous membrane without wounding it. The staff has a short curve (see Fig. 107), and the groove extends only through the straight portion, which is quite sufficient, since wherever the point has made to pass the stricture the shaft in its groove will readily follow. The groove should always be on the upper concave side of the shaft, never on the lower. The manner of using this instrument is very simple. In most cases the filiform flexible conductor is first introduced as a guide, and the shaft of the instrument is then screwed upon it and made to follow it into the bladder. In many instances it is possible to introduce the shaft alone, armed with the blunt point which is always provided, when it is impossible to pass the conducting bougie. In either case, when the bladder is fairly entered, as may be recognized by the finger in the rectum, the penis is to be put upon the stretch, and the blade is carefully and gently, but firmly, thrust down to the extremity of the groove, dividing every obstruction before it. It is important to take care in withdrawing the blade lest it should cut healthy tissue. To this end the penis must be held tense, just as it was when the knife was pushed down (and the transverse folds were effaced). Then the instrument should be slowly drawn out, care being taken to keep exactly in the median line, which was traversed in the urethrotomy.

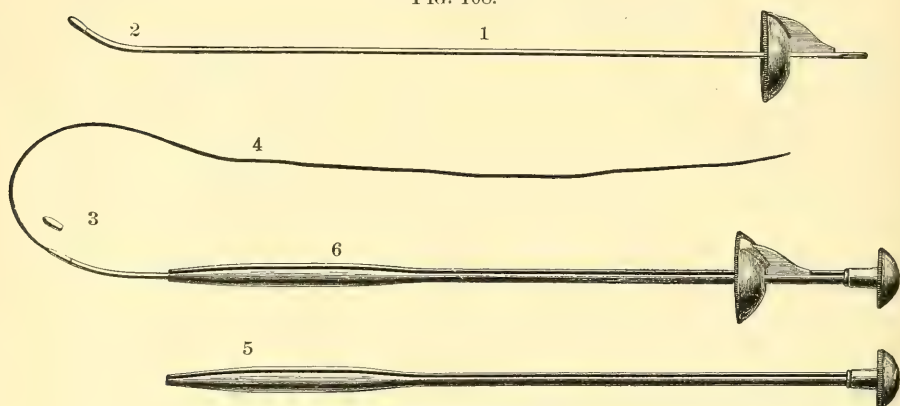
**Rupture or Divulsion.**—With perhaps few exceptions, surgeons in New York have ceased to treat strictures of the urethra by rupture or divulsion, and they agree with Stein,<sup>1</sup> "that it is dangerous, rude, inexact, and a purely mechanical means that does not exact and is exempt from surgical skill." This view is not entertained by a number of very able and conservative surgeons attached to the Massachusetts General Hospital, who employ Bigelow's divulsor, which they claim is free from the objections which apply to Holt's, Voillemier's, and Dittel's instruments. Using all antiseptic care, Bigelow's instrument is used in "soft strictures which are firm enough to cause retention of urine and which yield to little force." It is further claimed for this method that it is "at once accurate, easy, ready, safe, and almost bloodless."<sup>2</sup>

<sup>1</sup> *Medical Record*, May 25, 1889.

<sup>2</sup> The reader is referred to a very comprehensive article by Dr. C. L. Scudder, entitled "A Study of Four Hundred and Four Cases of Divulsion of Urethral Stricture; the results in Twenty-eight Cases," *Journal Cutaneous and Gen.-urinary Diseases*, vol. xi, Oct., 1893, pp. 383 et seq.

“The instrument consists of a slender staff (1), curved as is a steel sound at 2 for greater ease of introduction. The bladder end of the staff has a removable tip (3) for the attachment of a filiform guide (4). The divulsor proper (5) is a shaft expanded in a long, oval shape at the bladder end to act as a wedge, but is otherwise straight, and is grooved with a slot throughout its whole length (5) that it may fit the staff (1) as in 6. At the distal end of the staff is a shield for the glans penis,

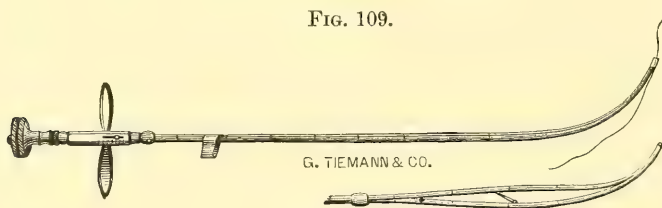
FIG. 108.



Bigelow's divulsor.

which is placed at a measured distance from the bladder end of the instrument, so that when the urethra is held on the stretch ready for divulsion with the instrument *in situ* there is absolutely no possibility of perforation of the bladder-wall. The left hand of the operator grasps the penis and staff, and holds the penis stretched toward the shield. The right hand of the operator pushes the divulsor through the stricture—*i. e.* the two hands approximate each other. Thus in the very act of

FIG. 109.



Gouley's divulsor.

divulsion there is a constant tendency away from the posterior bladder-wall.

“The operation is performed in this manner: The filiform guide is introduced to the bladder through the stricture. To the tip of the filiform is screwed the slender staff. This is then advanced into the bladder, following the guide. When the staff is well introduced and slightly depressed between the thighs, the several divulsors proper, beginning with the smallest size and running up to the largest, are introduced into the urethra on the staff and pushed through the stricture with an even, steady



force without violence. The divulsor as originally made was of three sizes, measuring respectively 23, 27, and 32 of the French scale. Larger sizes may be added."

As an accessory agent only in some very tight strictures near the penoscrotal angle and in the bulbous part of the urethra, and in some large and deep resilient strictures, Dr. Gouley's modification of Thompson's divulsor will occasionally prove very useful. The construction of this instrument is shown in Fig. 109. By means of a single lever the two parallel rods are made to "separate so as to form a long oval or spindle-shaped figure," the greater diameter of which will be equal in circumference to No. 18 of the English catheter scale, or even more. Gouley has reduced Thompson's instrument in size, and modified it so that it can be used with a whalebone guide. The dimensions of the instrument (Fig. 109) are two millimetres at the extremity and three and one-half at the part susceptible of greatest expansion. Another important modification is in the blades, which, instead of being flat or guttered on their inner surface for the first two inches from the point, are cylindrical, so that the urethral mucous membrane cannot be pinched and torn in withdrawing the divulsor, as it so frequently was when Thompson's instrument was used.

#### **Preliminary Considerations in the Examination of Cases of Strictures.**

—Every case of stricture of the urethra presents features peculiar to itself, consequently each case should be carefully studied in all its details.

The first consideration is the age of the patient. If he is young and under thirty years of age, in the majority of cases the stricture will be found to be of the soft or semi-fibrous variety. In some cases—rare, however, particularly when gonorrhœal infection has occurred long before puberty—the subject may suffer from true inodular stricture in early manhood. Beyond the age of twenty we find that strictures become more condensed and fibrous, while after forty, and particularly about the fiftieth year, the inodular or hard, fibrous stricture is quite common. Severe inodular stricture may be found in patients even as early as the thirtieth or thirty-fifth year.

The second point for consideration is the date of gonorrhœal infection. We must ascertain the age at which the disease was acquired and the facts as to the severity and length of the attack. Then the matter of relapses and later infections should be taken up, and the facts concerning them brought out. The inquiry is still incomplete until all facts as to the condition of the posterior urethra, the prostate, and the seminal vesicles are ascertained, together with full particulars as to the condition of the bladder and its functions.

As a rule, we do not find secondary kidney complications in cases of stricture until after the fortieth year. These complications are preceded by cystitis of varying grades, which may exist several or many years before the infective inflammatory process invades and creeps up the ureters and involves the pelvis and parenchyma of the kidneys. In all cases, and particularly in subjects over forty or fifty years of age, the condition of the bladder and kidneys is a very vital question in the matter of treatment of stricture of the urethra.

It is further necessary to take into consideration the general health of the patient, his habits, his temperament, his occupation, and his mode of life.

Coming down, now, to a consideration of the stricture itself, it is necessary to inform ourselves as to its symptoms, and particularly as to how much it interferes with urination. Then the frequency of the urinary act is to be considered. If there are any complications, such as fistulæ or rectal disorders, these must be borne in mind in forming an estimate of the case. As to the stricture itself, it is necessary to determine its location and its degree of contraction, together with the amount in length of the urethral canal which is damaged.

If the patient had at an earlier date been operated upon for stricture, all the facts relating to this operation and its results should be gathered, and due weight should be attached to them. Further than this, the length of time in which the stricture underwent recontraction is an important point.

*Methods of Instrumental Examination.*—It is a good rule to have the patient pass his water in the presence of the surgeon before he submits to examination. In the examination of the urethra for stricture it is always best, at first, to use an olivary bougie of about 20 or 22 F., which, after lubrication with pure white vaseline, should be slowly introduced into the canal and passed downward until an obstruction is met. To my mind, this instrument, thus introduced, gives a better idea of the state of the canal as far as the stricture than any other, and this is the first condition to ascertain. When the stricture is not very tight, the olive point of the bougie may enter it as far as its expansion. Then on its withdrawal a small *bougie à boule*, 9 to 10 French or larger if indicated, may be carefully introduced, and if it traverses the stricture without impediment, on its return the shoulder of the bulb will give very important information as to the amount of urethra which is the seat of coarctation, and to the condition as to firmness or succulence of the stricture-tissue. In practice, the *bougie à boule*, as a general rule, will give no precise information and will not adapt itself to ready use in sizes under 9 or 10 F. It may be difficult in many instances to introduce these small sizes. When strictures will admit larger sizes of this form of bougie than from 12 French upward, their use is generally productive of much important information.

When it is necessary to use large bulbous bougies, the meatus may sometimes be too small to admit them. If expedient in these cases, the meatus should be properly incised, but if for any reason meatotomy is at the time inadvisable, the urethrometer may be employed. With this instrument it is only necessary to determine the lessened calibre of the canal at the stricture, taking 30 or 32 F. as the standard and the maximum. There is no need of making measurements of the canal up to 35 or 40 F., since that amount of distention is utterly unnatural, and operations based on that assumed calibre are, as a general rule, productive of infinite harm to the patient. By means, therefore, of the olivary bougie, the *bougie à boule*, and exceptionally of the urethrometer, we can generally obtain scientific knowledge of the nature and extent of strictures of the urethra from 9 to 10 French upward.

Much useful information may be gained by careful palpation of the pendulous urethra, and even of the canal nearly up to the bulb, by means of the finger-tips. This procedure will reveal little masses or rings of indurated tissue, and also localized spots where there is less than normal elasticity if they are present.

When the stenosis has reduced the canal to a calibre under 9 French, exploration should be made by means of correspondingly small olivary bougies or of filiform bougies.

Urethral examinations for stricture should be conducted with the utmost care, deliberation, gentleness, and good judgment. Our aim should be to cause the patient a minimum of uneasiness or pain, and not to distend the tissues any more than is absolutely necessary.

It is always an excellent rule to begin examinations with instruments of goodly size, and to use smaller and smaller ones as the condition of affairs indicates.

In strictures of calibre above 12 or 15 French there is usually no difficulty experienced in their exploration, and no preparatory treatment is, as a rule, necessary. In cases of tighter strictures more or less difficulty may be encountered.

In passing delicate olivary bougies and filiforms into the urethra much care and patience is required. The instrument should be well oiled, and then held between the finger and thumb in a delicate, easy manner. I have seen surgeons grasp these instruments in a clumsy and inflexible manner, and push and poke rather than skilfully manipulate. Steadying the penis with the left hand and everting the lips of the meatus with the thumb and forefinger of the same hand, the operator passes the bougie, held with the right hand, gently into the urethra. As the mucous crypts and follicles are seated mostly on the upper wall, the instrument is pushed gently forward on the lower wall, and if it catches in a follicle it should be withdrawn slightly and then pushed or coaxed along again. In this way we, as a rule, avoid the lacuna magna and other valve-like pockets and the orifices of ducts of glands. When the instrument is down on the face of the stricture, the penis should be mildly put on the stretch and held at right angles to the body. Then the very slight forward and backward movement of the bougie may be begun, with the idea of getting into the mouth of the stricture. Sometimes when the penis is held in the horizontal position in conformity with the thighs, the bougie will slip in easily, whereas before that it did not pass.

In many cases the prompt introduction of a small olivary bougie or a filiform may be brought about by injecting into the urethra and there retaining about two drachms of pure olive oil or liquid vaseline. This injection distends and lubricates the canal, and often allows a filiform bougie to slip through the obstruction, which before seemed impassable.

It is always necessary to bear in mind the fact that the mouth of the stricture may be eccentric rather than, as the rule, centric. Therefore, it is well, after having failed with the ordinary straight filiforms, to try those which have various twists and curves at their ends, since by these we may most unexpectedly succeed when we had already perhaps given up hope of passing the stricture.

It is always well to have several Banks filiforms at hand, since they often prove very useful at unexpected contingencies. In cases where much difficulty has been experienced, but where the passage of a filiform has been accomplished, this instrument may be left in for an hour or two, and then a Banks filiform may be introduced, and by means of it such temporary dilatation may be accomplished that the subsequent treatment of the case is rendered materially less difficult and trying.

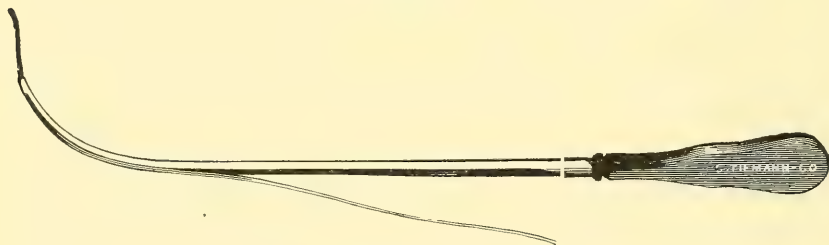


In some troublesome cases it is well to pass several (as many perhaps as six) filiforms as far down as the stricture, and then to inject the urethra with oil, after which the surgeon should try to pass each bougie individually. In this way he may often succeed, whereas before adopting this expedient he had failed utterly. In some very troublesome cases I have succeeded in getting through a stricture by first passing down to its face several filiforms, and then by means of a hard-rubber uterine syringe, introduced as far down as possible, injecting about two drachms of very warm olive oil, and holding it in the canal well down by means of compression by the fingers. In this distended and lubricated condition of the urethral canal the orifice of the stricture is often so much dilated that it will allow the filiform to pass through.

There is another method of procedure which should never be forgotten. This, in the main, consists in the employment of a truncated catheter. A silver catheter (20 or 22 F.) is cut off at right angles to its shaft at the length of six inches. The cut end is then rendered round, smooth, and harmless by means of a thin ring of solder, which is evenly moulded around the distal end of its lumen. This catheter then becomes a very useful conductor. It is well oiled and passed down to the face of the stricture, and there held gently but quite firmly; then through it filiforms are passed and gently manipulated. In many cases, even when success is not hoped for, this procedure will result in the passage of the bougie.

Having succeeded in passing the filiform into the bladder, the surgeon can moderately dilate the canal by sliding over it one or more increasing sizes of Gouley's tunnelled sound. By this procedure (assuming that

FIG. 110.



Gouley's tunnelled sound (and guide).

urethrotomy is not contemplated) the surgeon generally places the urethra in such a condition that it will be passable for a day or two, at least, by instruments. If, however, the operation of internal or external urethrotomy is indicated, and the time and conditions are favorable to its performance, the surgeon then has a clear field.

If, after prolonged efforts to reach the bladder, much uneasiness is produced and much hemorrhage occurs, and the instrument still does not pass, it is well to stop the examination and wait for a day or two.

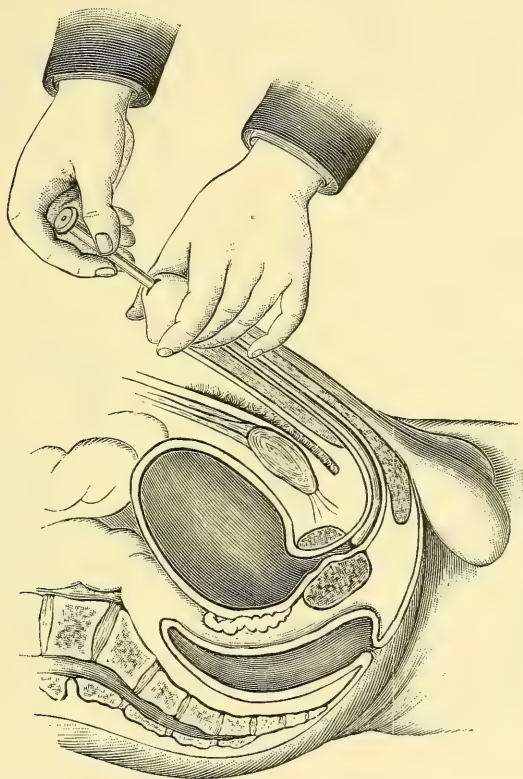
In some cases, after one or more failures in introducing very small instruments through a stricture, it may be necessary to put the patient to bed, to allow him a very spare diet (bread and milk preferably), and to purge him well, in order to relieve the pelvic organs of congestion. As a result, strictures previously impassable will often allow the instrument

to glide into the bladder. In many cases rest, an opium suppository, and a hot bath will relieve the stricture of congestion, so as to allow the passage of the exploratory instrument.

For various reasons, more or less urgent, it is often necessary to pass sounds and catheters through the urethra into the bladder.

*Introduction of the Catheter or Sound.*—A catheter or sound may be introduced while the patient is in the standing<sup>1</sup> or sitting posture, but the

FIG. 111.



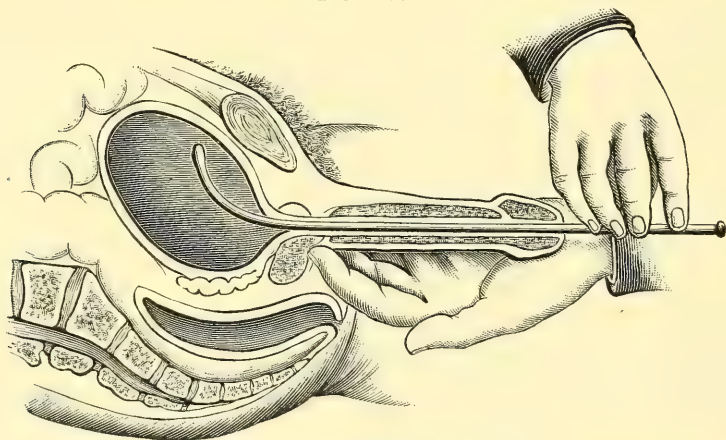
First step in introducing a catheter.

recumbent position is on many accounts the best, the patient lying square on the back, with the shoulders elevated, the knees drawn up and somewhat separated, the genital organs entirely exposed, and the surgeon standing on his left. The operator now raises the penis to an angle of about sixty degrees with the body, thereby effacing the anterior curve of

<sup>1</sup> A method of passing the sound known as the *tour de maître* is much preferred by some surgeons. It is a very simple, easy, and expeditious procedure in the hands of men of large experience, but to the beginner it may prove a stumbling-block which will bring mortification to him and pain and discomfort to his patient. The surgeon sits, and the patient stands before him. The sound is introduced with its convexity facing the pubes as far down as the bulb; then the shaft is quite rapidly rotated toward the abdomen, when the point readily slips into the membranous urethra and the handle is depressed between the thighs. When skilfully done, this operation is unattended with any unpleasant symptoms whatever to patients, many of whom prefer it on account of its ease and celerity.

the urethra, by means of the ring and middle finger of the left hand, its palm looking upward; the thumb and fore finger are thus left free to retract the prepuce and separate the lips of the meatus. The catheter, previously warmed and oiled, is held lightly between the thumb and fore and middle fingers of the right hand "like a pen," its shaft corresponding to the fold between the abdomen and the left thigh. The introduction of the instrument should be slow and with the exercise of little force; its own weight is almost sufficient to effect its passage if properly directed; if any obstruction be met with, the instrument should be withdrawn for a short distance and again advanced with the direction of its point slightly varied. While passing through the first two inches of the urethra the point of the instrument is inclined to the lower surface in order to avoid the lacuna magna, and it is well to hug the lower wall until the end of the instrument has passed the peno-scrotal angle; beyond this it should be directed rather to the upper surface to escape the sinus of the bulb; when it has penetrated beneath the pubes, the shaft is brought round to the median line of the body and parallel to the surface of the abdomen; the handle is now to be elevated to a perpendicular, and, pressure being

FIG. 112.



Second step in introducing the catheter.

made with the disengaged hand upon the mons Veneris and the root of the penis for the purpose of stretching the suspensory ligament, be gently depressed between the thighs, not forgetting meanwhile to maintain a certain amount of progressive motion in the instrument, when the point will usually glide into the bladder. If any difficulty is met with at this stage of the proceeding, it is probably because the point has caught in the extensible tissue of the bulb, and the instrument should be again raised to a perpendicular and slightly withdrawn, and the penis elongated by traction before the manœuvre is repeated. Further assistance may be obtained, if necessary, during the latter part of the introduction by gently pressing against the convexity of the instrument just back of the scrotum or by introducing a finger into the rectum, ascertaining the exact position of the point, and guiding it forward and upward against the posterior surface of the symphysis; the passage of the extremity over the uvula



vesicæ is often indicated by nausea or a slight tremor on the part of the patient, and its entrance into the bladder by a flow of urine.

When dexterously and gently performed, the introduction of the sound or catheter is accomplished without a hitch or halt in most cases. By want of gentleness and by bungling procedures spasmodic contraction of the involuntary muscle-fibres of the pendulous urethra may be induced, and also spasm of the compressor urethræ muscle. In this event it is well to desist or to press the tip of the instrument gently and continuously against the obstruction until spasm ceases, and then it will slowly glide onward.

To recapitulate: In this operation it will be seen that the first possible obstacle is the lacuna magna, which is avoided by keeping the point of the instrument on the lower wall for the first three inches of the canal. Then by holding the instrument along the fold of the groin there is no fear that its point will impinge against the symphysis pubis, which it might do if the abdomen was distended and the instrument held in the median line. When the instrument is five or six inches down the canal, during the passage of which its tip glides over the under wall of the urethra and its point is under the symphysis, this part is then to be slightly, and sometimes decidedly, elevated, and then it enters the membranous urethra. At this time the shaft of the instrument is to be elevated and brought exactly in the median line. As the tissues of the bulb are rather loose and very extensible, it is necessary here to make sufficient traction on the penis to render the whole spongy urethra tense, smooth, and free from folds. Then, when the tip of the instrument is in the orifice of the membranous urethra and directed slightly upward, its handle, held very gently between the right thumb and fore finger, makes a circular turn, and as it does so the whole subpubic curvature is traversed by the curve of the instrument, and its end then protrudes into the bladder.

*Catheterization in the Pouchy Condition of the Bulbous Urethra and in Enlargement of the Prostate.*—In the directions just given for the passage of curved sounds and catheters it is assumed that the urethral canal is in a normal or nearly normal condition. In elderly persons there are two segments of the urethral canal which may offer resistance to the passage of curved and also straight instruments in the classical manner. These are, first, the bulbous and bulbo-membranous portions, and, second, the prostatic portion.

In many old men the bulb of the urethra becomes redundant, pouchy, and its relaxed membrane is very much thrown into folds. As a result of this flabby condition, when the end of the instrument reaches the sinus of the bulb the tonicity of the tissues is so lost that there is nothing left of a firm character to guide its onward progress. As a result, the end may impinge on the sagging lower part of the bulb, and there be held as in a true cul-de-sac. Then, again, it may press against the upper wall of the bulb, and its further progress is impeded by it and the anterior layer of the triangular ligament. In general, the end of the instrument catches in the lower, pouch-like part of the bulb, and it is here that false passages are usually made, in which case the instrument either pierces the triangular ligament or glides under it and makes a pathological channel in the soft tissues beneath the membranous urethra and the prostate. False passages may also be made on either side of the lower part of the

bulb. When a false passage is made in the upper wall of the bulbous urethra, the end of the instrument, after passing through that structure, continues on through Henle's deep transverse ligament of the pelvis until it juts into the prevesical spaces. (See pages 39 and 44.)

This abnormal anatomical condition of the bulbous urethra has to be met with appropriate instruments. What is needed under these conditions is an instrument of sufficient firmness of structure to make its way through the canal, whose end points slightly upward, and which at its curve shall have such a shoulder that if it sinks down to the lower wall of the pouchy bulb its tip will then point upward and strike the orifice of the bulbo-membranous junction. The instruments which best fulfil these requirements are the Mercier coudé and bi-coudé catheters. (See Fig. 101.) Whether these instruments are used by the surgeon or by the patient, it is always very necessary that there shall be some reliable guide which shall point to the side of the instrument which corresponds to its convexity. As a rule, little reliance can be placed on the surface marking of the catheter; therefore it is well to cut off obliquely by knife or scissors the distal end of the instrument, so that its long wall will correspond to the convex surface of the catheter. In this way the oblique end of the catheter will look toward the abdomen of the patient, and it will be equally certain that its point also is directed forward. This little matter should never be forgotten.

Many of the coudé catheters on sale are faulty by reason of the shortness of their curved portion, which, as before stated, should be fully one inch long, and in accordance with the curve depicted in Fig. 101. A coudé catheter will commonly traverse canals whose bulbs are distorted by age. It should be well oiled, and slowly and carefully passed down the urethra, and as it traverses the bulbous urethra it is well to gently guide its course by steadying, not pressing, the parts just back of the scrotum. By this manoeuvre the point is made to enter the membranous urethra, and the patient may be relieved.

In some very marked instances of the pouchy state of the bulbous urethra the bi-coudé catheter will prove very serviceable. The rationale of its use depends upon its conformation, by which its much-curved portion rests on the floor of the relaxed bulb and its end points upward toward the hole in the triangular ligament. In some cases there is difficulty experienced in passing these catheters, and then it is necessary to be patient and try to follow the natural route. In several trying cases I first injected into the bulb four drachms of warmed olive oil, which so distended it that the instrument readily passed through the membranous urethra.

In enlargement of the prostate, in the main, three abnormal conditions are encountered in catheterization. In the first place, the urethral canal may be much elongated by the progressive growth of the gland toward and in the bladder. In the second place, by its concentric growth this organ so contracts the urethral lumen or distorts its normal straightness of direction and renders it sinuous that much impediment to urination is produced. In the third place, the uvula vesicæ or the urethral and bladder tissues just at the commencement of the urethra, on its lower wall, become so hypertrophied that a true valve obtrudes itself in the vesical orifice, or this opening is more or less obliterated by the presence of a firm bar of tissue which extends across the lower part of the canal. Now,

these pathological conditions also have to be overcome by means of appropriate catheters.

In the majority of cases of elongation of the urethra, with a corresponding greater curve of the canal, the bladder can readily be reached by means of the extra-curved olivary catheters (see Fig. 100) called prostatic catheters. These instruments, when used in sizes of 20 to 24 French, are much more serviceable, as a rule, than the smaller and larger ones are. They are much to be preferred to the old-time silver prostatic catheter, which by its density and inflexibility often caused pain and uneasiness. The long curve of these prostatic catheters is often of material aid in traversing a pouchy bulbous urethra.

In some cases soft India-rubber catheters or straight, blunt-pointed, lisle-thread catheters will readily traverse the urethral canal which is lengthened or distorted by prostatic hypertrophy.

It may be necessary, when the calibre of the prostatic urethra is much reduced or its straightness much distorted, to use these catheters with the long curve or the straight ones in sizes smaller than 20 F.

When the catheters already spoken of cannot be obtained, the old-style brick-red English catheter may be used if at hand. It is well, if it is a straight instrument, to soak it in hot water, then give it the necessary curve, which may be rendered sufficiently permanent by immediate immersion in very cold or iced water.

In cases of valvular obstruction or of a bar at the vesical orifice much difficulty may be met in reaching the bladder-cavity. Sometimes the tip of the Mercier catheter, particularly when smaller than 20 F., will glide over the obstruction in a surprisingly prompt manner. Then, again, it may strike against it, and no manœuvre will cause it to traverse it.

In many cases the gum-elastic prostatic catheter will, by the forward tilting or bending of its tips or forward pressure, glide past the obstruction upward into the bladder.

In these obstinate cases it may be necessary to use Otis's prostatic

FIG. 113.



Otis's prostatic guide.

guide, which will steady and direct a soft-rubber catheter. Or the ordinary wire which is found in English catheters, or a piece of ordinary wire ten or twelve inches long, may be curved in accordance with the long prostatic urethra. This wire is introduced into a soft-rubber catheter, and then the combined instrument is passed until it reaches the bladder or comes to a standstill on meeting the obstruction. Then it is well to withdraw the wire for about half an inch, and again push forward, when the flexible end may clear the obstruction. If this procedure fails, the surgeon should still further pull out the wire another half an inch, and then try to pass the obstruction. In case of final failure the condition of the case will determine in the mind of the surgeon whether it is necessary to aspirate, to reach the bladder by external urethrotomy by Cock's operation, or to perform suprapubic cystotomy.

I have purposely avoided mentioning the vertebrated silver catheter,



for the reason that it is a very unreliable instrument, which may, even if carefully used, damage the urethral canal, and which it is almost impossible to render aseptic.

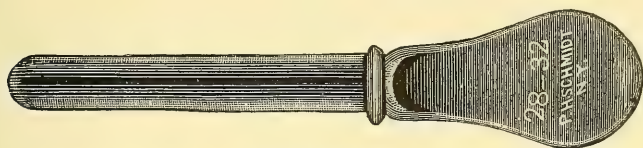
**Treatment of Contractions and of Strictures at and just within the Meatus.**—It has already been stated that normally the lumen of the meatus is from 21 to 28 French, as a general average. (See page 48.) By a wise provision of Nature the end of the urethral canal is so much narrowed that the stream of urine is projected well in advance of the body and in a solid jet, in accordance with hydraulic principles. Exceptionally cases are met with in which there is a greater or less abnormal contraction of the meatus. When this is only moderate, there may be no disturbance in the function of urination. But in some cases the meatus is exceedingly small, even of a pinhead size, and then much functional disturbance may result. The prominent symptoms in cases of very small meatus are frequent, painful, and prolonged micturition and deep-seated urethral uneasiness or irritation, together with vesical irritability. In some seemingly well-observed cases such symptoms as anterior crural neuralgia and sciatica have been found. Many incorrect and exaggerated statements have been made as to the serious conditions which often accompany contracted meatus. Thus it is stated that the anomaly gives rise to pain in the back and hypogastrium, groins, and testes, to hydrocele, to painful seminal emissions, and to paresis and softening of the brain. The truth of the matter is about as follows: In men free from gonorrhœa or urethral irritation the urinary functions may be perfectly performed even if the meatus is no larger in calibre than 10 French, and there may be no abnormal symptoms. When the urethra has been the seat of gonorrhœal inflammation, congestion from masturbation and sexual excesses, and perhaps of tuberculosis, the narrowed meatus may cause conditions which react upon and render more intense these inflammatory states, which may perhaps depend upon mechanical causes or possibly upon reflex action. It is certain that no positive statement can be made as to the mode of causation.

In former years, when exaggerated views on the influence of contracted meatus were very generally entertained, this part of the human anatomy was extensively and vigorously incised. The operation of meatotomy or porotomy became routine practice, and large numbers of men were unnecessarily cut up to 35 or 40 French in order to cure more or less severe ailments which were said to have their origin in the urethral orifice. This epidemic, happily, is on the steady decline, but to-day we not infrequently see men into whose fossæ naviculares the first joint of the fore finger may be readily introduced, and who on urination pass slow, heavy, and sputtering streams which hardly clear their knees, and which are as ungraceful as the flow of Croton water from the hydrant.

The logical deductions warranted by the foregoing facts and considerations are—1, that when an abnormally small meatus causes a decided impairment of the urinary function, it should be cut in a conservative manner; 2, that when the smallness of the urethral orifice is found to be the undoubted cause of the perpetuation of deep urethral inflammation of any kind, it should be enlarged; and, 3, that when the meatus will not admit of instruments sufficiently large to act upon deep-seated urethral lesions, it should be incised in keeping with the necessity.

In general, the contraction of the meatus is due to the excessive development of the mucous membrane at the lower commissure, and exceptionally a septum of mucous membrane stretches across the canal from the upper commissure and encroaches more or less on its lumen. Consequently, it is necessary to examine each case by separating the lips and also introducing a curved probe in order to determine whether the incision is to be made upward or downward. The part having been rendered aseptic, an incision should be very carefully made exactly in the middle line by means of Civiale's concealed bistoury (see Fig. 102) or of the straight blunt-ended bistoury. It is well, as a general rule, to make the incision large enough to admit a 32 F. meatus sound, supposing that

FIG. 114.

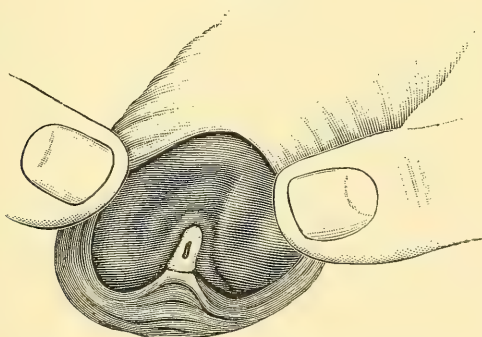


Meatus sound.

the urethra will comfortably admit a No. 30 F. sound. If the urethral lumen is less than 30 F., it is well to cut the meatus in accordance with its measurement. In the majority of cases it will be found that when the meatus finally heals the calibre will be about two sizes smaller than the meatotomy made it. After incision of the meatus pressure will usually stop bleeding in a short time. The meatus sound (there are varying sizes of this useful little instrument) may be introduced every two or three days for several weeks. It is thus necessary to keep up the process of dilatation, since these parts show a decided tendency to promptly contract.

Cicatricial strictures of the meatus are not very common, and in general follow the initial lesion of syphilis when seated here. In many cases of

FIG. 115.



Stricture of the meatus following hard chancre.

chancre of the meatus the urethral lumen is not at all impaired after its involution; in others there may be slight contraction, and exceptionally a dense fibrous ring is left, which may reduce the size of the orifice to No. 2 or 3 French scale. This form of stricture is well shown in Fig. 115.

Chancroidal ulcers, and exceptionally chronic relapsing herpes pro-genitalis, may cause cicatricial stricture of this orifice. A scleroderma-tous condition and keloid may also cause abnormal contraction of the meatus and fossa navicularis. In these cases of stricture due to new tissue-formation the incision should be made in accordance with the seat of the obstruction. The passage of a probe will show whether (as is generally the case) it is necessary to make an upward and also a downward incision, and it will indicate the necessary depth of the cuts. The subsequent treatment consists in the careful introduction of the meatus sound. This operation should be repeated for a considerable time, sometimes many months, until all tendency (which is great) to recontraction has ceased. If, as a result of this operation, the meatus will admit a No. 30 French sound, it may be pronounced to be satisfactory.

**Treatment of Strictures in the Pendulous Portion of the Urethra.—**

The urethra from the peno-scrotal angle to the meatus, corresponding to Regions Nos. 2 and 3 of Thompson's division, is in many cases the seat of stricture, but it is rather less frequently affected than the first region, which includes the bulbous portion of the canal.

In the pendulous urethra, which extends to the peno-scrotal angle, many changes take place as the result of gonorrhœal inflammation which should be separately considered.

For purposes of description it is well to study urethral contractions, inch by inch, down the canal, since the surgical indications and requirements vary very much in different portions of the anterior canal.

In chronic gonorrhœa the two inches of the urethra just beyond the meatus may be the seat of soft infiltration, which is thus limited or which may be continuous with a morbid condition of the urethra beyond. In practice we not uncommonly find strictures of this part. They may be met with in the semi-fibrous or well-developed fibrous form. Inodular stricture is rarely found here.

Semi-fibrous strictures of the segment of the urethra under consideration may be much benefited by dilatation with the straight steel sound, provided they are seen early enough. As a rule, however, these cases come to us when the urethral canal is the seat of fibrous infiltration, which further shows itself by the existence of one, several, or many ring-like bands. The canal is then the seat of fibrous stricture, which in this region is usually very dense and unyielding. The calibre may be 15 to 3 or 4 French scale, and the bulb introduced and withdrawn bumps roughly over a dense membrane with contractions. It may be stated as a general rule that in these cases dilatation is not to be used, since it will produce of itself little if any effect, and will cause pain and uneasiness.

These strictures require careful incision, for which purpose Gouley's probe-pointed bistoury and the straight blunt-pointed bistoury are the necessary instruments. The parts having been thoroughly cleansed, cocaine anæsthesia may be produced by the injection into the urethra of a 10 per cent. solution. If the contraction is very small, the canal may be widened sufficiently by a moderate downward cut with the Gouley knife, and then an upward and a downward cut exactly in the median line should be made with the blunt bistoury. These parts never should be cut recklessly, either into the space between the cavernous bodies above or into the cellular tissue below. If after this simple form of urethrotomy a



No. 25 to 28 F. straight steel sound can be introduced readily and without pain to the patient, the result may be considered good. In these cases it is utterly impossible to fully restore the suppleness of the urethral walls, but much can be done by careful dilatation kept up long after the incisions. Stricture-tissue in this portion of the urethra is very prone to rapid condensation and contraction; hence there is always a battle in these cases to keep the urethral canal of moderately large size. Though some authors recommend over-dilatation and a general vigorous treatment for these distal strictures, I am firm in the conviction that moderate and gradual dilatation up to 25 F., and perhaps a little above, will in the end give the patient the best results. In cases of large urethra perhaps we may establish a calibre of 30 F. This, however, may be said, that if five years after this little operation the patient can pass a No. 25 F. sound, he is a lucky man.

We sometimes meet cases in which the contraction is from one to two inches down the canal, and a 15 French bulb passes readily beyond it. For these cases Civiale's urethrotome is particularly adapted. Localizing the fibrous patch or band by means of the expanded portion of the instrument, the penis is rendered tense and the tissue is cut on the upper wall of the urethra to about 28 or 30 F. Then the straight steel sound may be passed, and while it is in the canal moderate pressure may be exerted on the morbid tissue. By this means considerable absorption may be produced.

To recapitulate: In the urethra contiguous to the meatus we usually find, in practice, firm fibrous strictures, generally *en nappe* or in tubular form, which require simple incision, followed by gradual dilatation for long periods. If in these cases we can restore the urethra to a calibre of 25 to 28 F. and keep it, the result may be considered very excellent.

### The So-called Strictures of Large Calibre.

Some authors claim that the normal urethral calibre is much greater than that given in this work. They base their statements on the fact that the urethra may be dilated by the urethrameter up even as high as 40 F. They further make the claim that the calibre of the urethra is or should be uniform in its whole course; consequently if a urethrameter is introduced into a canal and screwed up to, say, 36 F., according to these views this expanded bulb should pass smoothly out when the instrument is withdrawn. If, however, the instrument hitches or halts or jumps over moderate obstructions, these narrowed parts are called strictures, and the patient is told that he has one or more strictures of large calibre. I am free to say, as I have said before, that there is not a man alive whose urethra will stand this treatment of exploratory over-dilatation and allow the bulb to glide easily and unobstructedly out. The trouble with this matter of strictures of large calibre is that the assumptions regarding them are based on conclusions drawn from the use of the urethrameter, and on theories as to the nature of stricture of the urethra. We already know the morbid process which leads to stricture. (See Chapter VI.) Now let us study in more detail the anatomical structure of the urethra. This subject has been exhaustively treated by Zuckerkandl,<sup>1</sup> particularly

<sup>1</sup> Art. "Harnröhre," *Real Encyclop. der Gesammten Heilkunde*, 1887, vol. ix. pp. 50 et seq.

in his lectures and also in a recent essay. Outside of the mucous layer of the urethra are two muscular layers which extend from the vesical orifice to the meatus, being particularly strong and thick in the prostatic urethra. The outer muscular layer consists of fibres forming distinct rings, while the inner muscular layer consists of longitudinal fibres. When the penis is in a flaccid condition these muscular fibres lie rather near together, but when it is erect, and when the urethra is much distended, they are stretched apart. The longitudinal muscular fibres in the torpid condition of the penis contract mildly and shorten the urethral canal, and throw it into transverse folds, while the ringed fibres bring the walls into such a collapsed condition that the urethra is converted into a long thin slit. Now, when the urethra is, in the dead subject, injected with some hardening fluid, and the canal is then dissected out, it presents the appearance shown in Fig. 116. It will be seen that the

FIG. 116.



Shows a normal urethra distended with solidifying injection-material. The contractions correspond to the circular rings of muscular fibres.

canal is both elongated and much distended, and that at quite regular intervals there are certain depressions which show decided contractions (about eleven in number) in its continuity. Now, these constrictions are caused by the resistance of the muscular rings, which are forced widely apart and put on the stretch. Between these muscular rings the dilated portions consist of mucous membrane and its ambient fibrous tissue. Now, when we apply these anatomical facts to clinical observation and instrumental examination, many points which have until now been obscure are rendered clear. These muscular rings will allow of very considerable stretching by the urethrometer, but they finally offer resistance, while the tissues between them, being less firm and more extensible, yield, and as the bulb of the instrument is drawn out it is held by a muscular band on its proximal end, and this contraction is then, by many, pronounced to be stricture. Consequently, I say that surgeons imbued with the belief that the normal calibre of the urethra is much above 30 F., and that the lumen of the canal in health is unvaryingly uniform in calibre, can find strictures in the urethra of any man if they will only turn the bulb of the instrument on strongly enough. Dr. R. W. Stewart<sup>1</sup> very truly says, in speaking of the dilatibility of the urethral canal and of promiscuous manipulations and manipulators, "The urethrometer will seldom disappoint him in his search for strictures, and it is just in such

<sup>1</sup> "Some Observations on Stricture of the Male Urethra," *New York Medical Journal*, April 12, 1890.

hands that the urethrometer is capable of so much mischief that it is questionable whether its invention has been a means of alleviating or adding to the misery of humanity."

Unfortunately, nearly every recent graduate in medicine and young doctor thinks that there is in him the making of a good genito-urinary surgeon or of an efficient gynecologist. Of the results of meddlesome and mischievous gynecology wrought by younger men I will not speak, but of the results of reckless temerity of many men in their wholesale onslaughts on the urethra in treating imaginary strictures of large calibre, I reluctantly say that to-day very many patients carry around with them incurable, disquieting, and painful infirmities.

I have in my private records, kept with all the care and accuracy possible, the details of several scores of patients, extending over a period of twenty years, who came to me with urethral trouble, but with a perfectly healthy condition of the urethra at and anterior to the peno-scrotal junction, who were said by some surgeons to have strictures of large calibre in the anterior part of the canal. In many of these cases the day for operation was set; in some instances the patients backed out, while a few were steadfast in their faith and they went like lambs to the slaughter. I here append the salient points of ten cases taken without selection as recorded; they certainly will tell their story.<sup>1</sup>

<sup>1</sup> 1. Patient said to have three strictures in the pendulous urethra. Diagnosis: posterior urethritis with occasional mild and ephemeral attacks of hæmaturia. Examination of anterior urethra showed it to be soft, supple, and free from inflammation.

2. P. said to have one firm band in the third region. Diagnosis: inflammation at bulb and slight posterior urethritis. Examination showed anterior urethra healthy as far as the peno-scrotal angle.

3. P. said to have six quite tight strictures, which should be cut to 36 or 38 F. Diagnosis: chronic anterior and posterior urethritis, with soft hyperplasia, epithelial thickening, and some discharge. Urethral lesion began in bulb and ended just anterior to the peno-scrotal angle.

4. P. was said to have one quite tight stricture three inches down, which needed free incision and over-dilatation. Diagnosis: chronic inflammation of one or more follicles, with some localized hyperplasia and some discharge.

5. P. said to have two bad strictures with reflex phenomena. Diagnosis: chronic posterior urethritis, with pain in cord and testes. Examination showed the anterior urethra to be normal.

6. P. said to have four strictures in pendulous urethra. Diagnosis: posterior urethritis, with involvement of prostatic follicles and much discharge (threads). Anterior urethra perfectly healthy.

7. P. said to have three anterior strictures which caused impairment of sexual function. Diagnosis: posterior urethritis. Anterior urethra normal.

8. P. said to have three strictures in Region No. 3, and spasm from reflex action in Region No. 1. Diagnosis: urethra perfectly healthy to peno-scrotal angle. Examination showed soft stricture near bulb, which caused some dysuria.

9. P. said to have four large-calibre strictures in Regions Nos. 3 and 2, and spasm deeper down. Diagnosis: a semi-fibrous stricture two-thirds of an inch long to 12 French just beyond the peno-scrotal angle. Urethra perfectly normal until stenosis was reached.

10. P. said to have several well-marked band-strictures in Regions Nos. 3 and 2, and spasm of the deep urethra with reflex phenomena—pain in testes, thighs, and lumbar region. Diagnosis: diffuse soft stricture of the bulbous urethra to 14 F. Anterior urethra absolutely normal.

As an addendum to the foregoing it may not be amiss to quote the words of the late Dr. Sands on this subject:

"I may remark, in passing, that if those who are cutting and curing organic strictures by the hundred, and who seldom see a meatus urinarius which they consider normal, would pay a little more attention to the study of pathological anatomy, they would add weight to their testimony, and obtain knowledge which might induce them to modify



Though the craze for indiscriminate cutting and over-dilating the pendulous urethra is on the wane, it is yet necessary to speak in strong condemnation of it. The following synopsis of a reported case will certainly teach an instructive lesson: The patient was said to have three strictures of the calibre of 24 F., and the surgeon felt called upon to cut to 32 F., using Dr. Otis's dilating urethrotome. After the operation the following symptoms and conditions presented themselves: Profuse and alarming hemorrhage; retention of urine; severe chill and fever; extensive urinary infiltration into the connective tissue of the penis; acute urethritis; and finally curvature of the penis. This series of calamities came to a man whose urethra, by the confession of the surgeon, was only reduced to 24 F.—a condition in all probability curable by gradual dilatation, without any pain, risk, or bad sequelæ. But still worse calamities have been reported as following this operation, which I quote literally: they are suppression of urine, severe urinary fever, vesical incontinence, frequent micturition day and night for years, and in some cases death.

There is one point which deserves emphasis—namely, that many authors who report orally or in journals cases of large-calibre strictures of the anterior urethra, as a rule say nothing about the posterior urethra. In like manner, their words and their writings give but a faint idea of the frequency and inveteracy of curvature of the penis. When the truth is told, this is not the simple and ephemeral condition which it is said to be. A few years ago it was, I may say, quite common, and was the source of great mental suffering to those thus afflicted. In some very rare cases mild curvature may disappear, but, as a rule, when it begins it comes to stay, and leaves the penis in a distorted condition, and, in many instances, its bearers are wholly incapable of intromission.

Curvature of the penis results from two causes: first, the deep incision through the urethral wall and into the connective tissue under and between the corpora cavernosa; and secondly, from the great irritation caused by synchronous over-dilatation. Luckily for the male portion of the human race, the knife of the dilating and cutting instrument, as a rule, does not cut deeply or through the mucous membrane, and thus, the incision being slight, the patient in many cases escapes without curvature.

The great mischief to the urethral canal is done by the dilator and by the introduction of the very large sounds which until late were so much in evidence.

Scores of men have been permanently injured by the method of over-dilatation of the urethra. They present themselves, according to my study and observation, for relief (after having gone the rounds in consulting many genito-urinary surgeons) for the following conditions: 1, permanent frequency of micturition from urethro-cystitis; 2, incontinence in varying degrees; 3, a sclerotic and deep-red condition of the urethral canal, giving forth a sticky, muco-purulent discharge due to very dense

their opinions. The frequency with which urethral strictures is said to be met with now-a-days calls to mind the account of a rectal specialist who practised in the western part of England in 1844, and who claimed to treat so extraordinary a number of cases of stricture of the rectum as to cause a layman to send a communication to the *Provincial Medical Journal*, stating that the disease was endemic in the locality where this practitioner resided, and advising strangers to avoid the place, inasmuch as nearly every person who went there became attacked.<sup>7</sup>

(and generally non-absorbable) small-cell infiltration around the whole or the greater part of the urethra anterior to the triangular ligament; 4, loss of power in expelling the urine, the stream being small and there being much difficulty in starting it; 5, well-marked hyperæsthesia of the urethral canal, so that the slightest and gentlest instrumentation causes great pain, which may persist for hours or a day or two. In these cases there is usually submucous infiltration; 6, pain in the bladder, loins, and over pubis; 7, in some cases impairment in the sexual function, absence of erections, feeble erections, premature ejaculations, and even impotence.

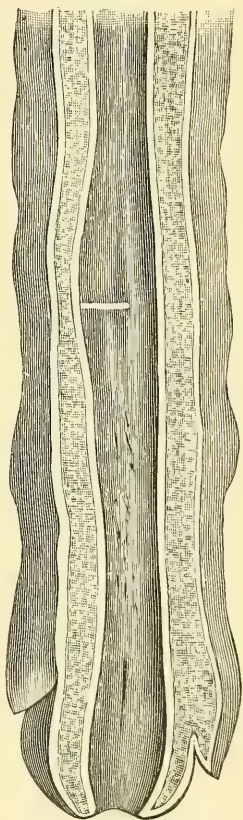
Any surgeon who is largely consulted for genito-urinary troubles now-a-days sees only too many of these distressing cases, many of which can only be moderately relieved; some may be decidedly benefited, while to others no relief can be offered.

The logical conclusions warranted by the foregoing statement of facts (which is dispassionately made and without one particle of exaggeration) is, first, that before a man shall be pronounced to be suffering from stricture its presence must be convincingly demonstrated by conservative methods of examination (*bougie à boule*, inspection of urine, digital examination of the urethral canal, and perhaps endoscopy); second, if stricture is really present, it should be treated on the basis of the maximum calibre of the urethra, being 30 or perhaps 32 F.; and third, very deep incisions with much distention, followed by over-dilatation, should never be practised.

Let us now consider the various conditions of stricture in the pendulous urethra up to the penoscrotal angle, and the necessary operative procedures.

Undoubtedly, as claimed by my friend Dr. Otis, some men present strictures of large calibre which impinge very little on the urethral lumen. In the early years of his studies I had the pleasure of seeing with him a number of such cases, and I appreciated the necessity for his inventive genius to devise instruments capable of efficiently treating these incipient contractions. It certainly seems a pity that in the hands of enthusiastic and even reckless men these delicate instruments have been so much misused. In Fig. 117 is clearly portrayed a thread-like semi-fibrous stricture which was seated in the urethral wall three inches down on its lateral portion, extending nearly but not up to the median line. Now, this is a fair representation of strictures of large calibre. This one formed only the segment of a circle, and more extensive ones form more or less perfect rings. It will be seen that if the surgeon had attempted to incise this stricture by means of the dilating urethrotome, it would have escaped the cutting

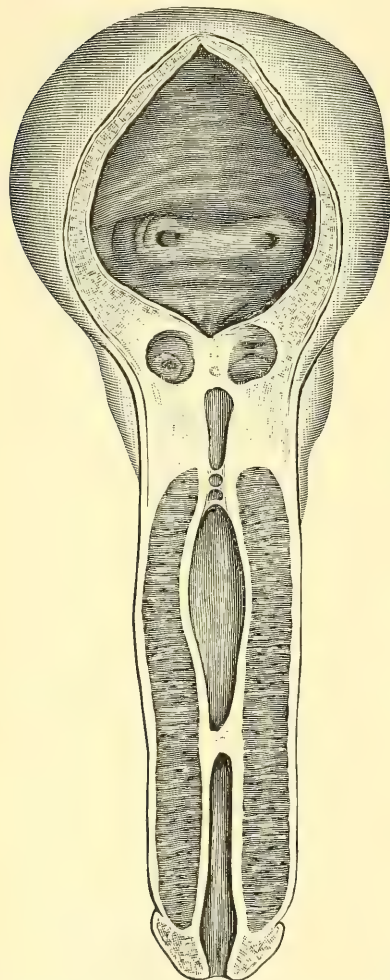
FIG. 117.



Thread-like stricture involving only a portion of the circumference of the urethra.

blade, which follows the median line almost exactly. This occurrence, therefore, is very significant, and points out the necessity of thorough examination in all cases. When the bulb of the *bougie à boule* was slipped over this contraction, the sensation was conveyed as if it was held by a distinct band or ring. The

FIG. 118.



Showing firm fibrous stricture in middle of pendulous urethra, dilatation of canal behind it, inodular stricture at bulb, abscess of prostate, hypertrophy of bladder, and dilatation of orifices of ureters. (From the Museum of the College of Physicians and Surgeons, New York.)

ture—an upper and a lower, and an incision in each of the lateral portions of the urethral wall.

Tight semi-fibrous and fibrous strictures are not infrequently found in

<sup>1</sup> "Les Rétrécissements larges de l'Urèthre," *Annales des Mal. des Org. Gén.-urin.*, 1893, pp. 721 et seq.

The same sensation is conveyed when only a segment of the urethral ring is thickened from hyperplasia; and in many cases, if the diagnosis is thus wholly based on the finding of the *bougie à boule*, the conclusion may be reached that an annular stricture is present, when really only a portion of the urethral lumen is thickened and less distensible than it is normally. Consequently, it is necessary to carefully palpate the urethra with the finger-tip over the shaft of the bougie in the canal in order to discover areas of new tissue, and in some cases to examine the urethra with the endoscope. Before making a diagnosis of stricture of large calibre the surgeon must convince himself beyond all doubt that the contraction is there, that it is not due to localized inflammatory deposits already described (see page 183), and that by his instrument he can reach and incise it.

Assuming that a stricture or strictures in ring or band form have been found, the surgeon has at his command—1, Civiale's urethrotome, which with practice becomes a very efficient instrument, and by which the constriction can be very accurately cut; 2, Otis's dilating urethrotome, which when judiciously used will cut with much accuracy and without damage to the urethra beyond the strictured part; and 3, Gerster's urethrotome. With these instruments he is prepared for any case. It may be well to mention that in a recent interesting essay Albarran<sup>1</sup> has advocated four mild incisions in cases of large-calibre stricture



the pendulous urethra. In Fig. 118 is very clearly shown a firm stricture about three inches from the meatus. This figure is worthy of study, and the following points may be noted: The urethra behind the stricture is dilated and its wall thinned; at the bulb are several bands and much sclerosis of the mucous membrane; at the prostate there is an abscess, and the bladder-walls are much thickened. It is not uncommon to find a single anterior stricture like the one here pictured, but I think it is more common to find the pendulous urethra the seat of extensive (as to length) coarctation, in which there may be several, even many, bands. In these cases the urethral canal anterior to the peno-scrotal angle is densely infiltrated, and these bands are simply the more prominent evidences of the morbid process.

In the **treatment** of these strictures in the anterior urethra much judgment and skill must be exercised. It is always well not to do too much in these cases. When the stricture-tissue is quite firm, we never can restore the urethra to its normal condition. Our function in these cases is to tunnel a moderately large passage, and then to try to keep it open. For these cases there is no more useful instrument at hand than Fluhrer's modification of Maisonneuve's urethrotome, using the blade which will cut a passage for a 22 sound or bougie. When this operation is performed the treatment may be said to have just begun. Thereafter the sound must be regularly introduced about once a week or less frequently. If in these cases the patient is left with a canal which will admit a 20 or 23 F. sound, and his bladder is healthy, the result may be pronounced very satisfactory. Some surgeons recommend over-dilatation, sometimes applied with much force, in these cases, but, as a rule, such measures only stimulate the process of recontraction, and they should not be used. With the dilatation treatment subsequent to incision medication may be, if necessary, applied to the posterior urethra and bladder, and indeed to any complication which may exist.

In these cases the bulbous urethra may also be involved, and it will require suitable treatment.

**Treatment of Strictures beyond the Peno-scrotal Angle.**—By far the greater number of strictures will be found just beyond the peno-scrotal angle, as far back as the bulbo-membranous junction. In treating this deeply-seated region it is a golden rule only to use the knife as a last resort.

In the chapter on Chronic Urethritis directions are given (see pp. 172 et seq.) for the treatment of the lesions of the anterior urethra, which need not be repeated.

Strictures of the bulbous portion of the urethra may be soft, semi-fibrous, fibrous, and inodular, all of which require appropriate treatment.

Soft and semi-fibrous strictures should, as a rule, never be incised until milder means have been tried and have failed.

The diagnosis having been carefully made, the calibre of the stricture is to be determined. Now, on this point no rule can be laid down, since cases differ so strikingly. Thus in some patients the canal may be reduced to 20 or 15 F., and yet these strictures are of the soft variety. In others, with similar calibres, they may be semi-fibrous or fibrous. Then, again, it is not very uncommon to find a urethra reduced even to 6 or 8 F. by an exudative hyperplasia which we call soft stricture. These

various and varying conditions have to be ascertained, and as the surgeon grows in experience he will become more and more expert in recognizing them.

*Gradual Dilatation.*—When the stricture in the bulbous urethra is yet in the soft, or even in the semi-fibrous, stage, the aim should be to remove as far as possible the cell-infiltration, and to thus, in a manner, restore the mucous membrane to its natural condition. This can be done in many cases by careful and gradual dilatation.

Seeing that a soft stricture may contract the urethral lumen even as low as 7 or 8 F., and that in many cases where the calibre is 15 or 20 F. the infiltration is yet soft and succulent, it is always well to make the attempt to cure by the introduction of the bougie or sound before the knife is resorted to. When, however, a fibrous or inodular stricture of small calibre is discovered, our chief thought is not toward gradual dilatation.

I have in so many instances been able to restore the urethra, even when contracted to 7 or 8, to 30 F. that I am always loth to operate more radically.

In the process of gradual dilatation much care, patience, and good judgment are necessary. The operation should always be carefully and slowly performed in a manner to cause no pain or uneasiness and no damage to the tissues. By the pressure and stimulation of the distending instrument we hope to cause the absorption of the exudation and to give tone and resiliency to the dilated vessels. It will thus be seen that we are always liable to cause inflammation, and this condition will either delay the cure or perhaps thwart our efforts. In cases where the contraction is as great as 7 or 8 F., and also where the calibre of the stricture is much larger, there may be posterior urethritis or even urethro-cystitis, and these conditions should then receive proper treatment.

Beginning with a small olivary bougie, the surgeon should gradually and slowly increase the size of the instrument as the progress of the case will indicate to him. In the early part of the treatment the bougie may be introduced once a week, and then in favorable conditions the interval may be fixed at about five days. It is almost always well to allow this interval of time to elapse between the séances of treatment. Many men have failed in this method of treating stricture by the too frequent introduction of the instrument, and many patients have not received the benefit they would have if there had been less haste. In gradual dilatation, particularly in the early stages, the sensations of the patient should be carefully considered, and the urine regularly and methodically examined. If the operation causes uneasiness and pain in the perineum and over the pubes and continued frequency in urination, and if the parts resist the gradual increase in the size of the instrument, it will be necessary to suspend the treatment temporarily, and perhaps permanently. In many of these cases local medication to the anterior and posterior urethra will put the parts in such a condition that gradual dilatation may again be resumed.

It will be generally found, when dilatation is commenced, in the form of stricture under consideration, with very small olivary bougies, that at first the sizes may be increased quite regularly, and no trouble, or perhaps very little, is experienced by the surgeon until he gets up as high

as 20 or 22 F. Then he will generally find that the dilating process will go on much more slowly, and that it may be necessary to introduce sounds of one size several times before larger ones can be used.

The prompt and usually perceptible effect of the early small bougies has much bearing on the future of the case. Patients watch the progress made step by step, and as they see that they are gaining in urethral calibre, and that they have lost their unpleasant symptoms (urethral or vesical), they become sanguine of an eventual cure, and present themselves regularly for treatment. It is most essential in these cases that the patient should have implicit confidence in the surgeon, and that he should keep his moral courage up in the ordeal through which he is going. Though these patients are neither hurt nor inconvenienced, the irksomeness of having at stated intervals to go to the surgeon is very trying to some. Others, and, indeed the majority, appreciating the infirmities and sufferings which strictures almost inevitably lead to, resolve to keep on till they are cured. The main, and indeed the only, valid objections to gradual dilatation are that it is a slow process and occupies a quite long stretch of time. But it must always be remembered that if it is followed up until the urethra is restored to a calibre of 30 F., in the majority of cases it will only be necessary to have sounds introduced once or twice a year thereafter; whereas it can be said, without fear of contradiction, that when a man's urethra has once been cut he has (if he would keep the channel open) to pass instruments at short intervals all his life. All these considerations should be presented by the surgeon to his patient as the treatment goes on. Men often get careless and even indifferent at the time when they may be said to be about half cured. In these circumstances the surgeon should use all his influence against faltering and back-sliding.

When in the course of this treatment the urethra will admit an olivary bougie No. 20 F., it is well to resort to the curved steel sounds and with them finish the cure. In many cases when the coarctation is extensive and involves the whole length of the bulbous urethra, the Benequé sound will produce particularly good results. Its double curve seems to exert a beneficial pressure not obtainable by the use of the ordinary curved sound.

The trend of thought as regards the treatment of urethral stricture of late years has been so unswervingly toward cutting operations that many surgeons are wholly unaware of the beneficent and lasting effects of gradual dilatation. I have many times been pleasantly chaffed and even mildly derided about my conservative views as to the treatment of the male urethra when the seat of contractions; but after a not inconsiderable experience, stretching over a period of twenty-seven years, I am to-day more than ever convinced that cutting operations should be a last resort, and that intemperate incisions and over-stretching are very frequently the cause of never-ending suffering and inconveniences.

It is impossible to exactly state the period of time necessary for gradual dilatation, since it varies in each case and much depends on the regularity and sedulousness of the patient. In some cases the normal urethral lumen may be restored in three months, and in others in six, nine, and twelve months. As a general rule, a six-months' treatment will be followed with better results than a shorter course.



Perhaps the details of a few instances of the beneficial results of gradual dilatation may be of interest. I have the records of the case of a man thirty-six years old who had gonorrhœa when twenty-six. His urethra had a calibre of 30 F., but just beyond the peno-scrotal angle it was reduced by a semi-fibrous coarctation to 7 F. Gradual dilatation was carried on with some irregularities and halts for fifteen months, at which time a No. 30 F. sound was readily passed into the bladder. This man returned after an absence of ten years, during which time he had had no urethral or bladder trouble, and had undergone no instrumentation, and the same sound was easily passed again. Now, I do not regard this as an exceptionally brilliant result, striking as it may seem, since I have seen very many such. During the course of a year I see fully twoscore of patients whose strictured urethræ were years ago brought up to a calibre of 30 F., or perhaps 32 in some cases, by gradual dilatation at my hands. Now, these men never suffered any pain or uneasiness in the treatment, their bladder function became perfect, and they thereafter urinated normally. They come back now once or twice a year, pass a full stream of healthy urine, say that they feel perfectly well, and go away happy after the introduction of a 30 or 32 F. sound. When such good results can be attained without cutting, without putting a man's life in jeopardy, and without pain or suffering, I say that we should, if possible, avail ourselves of the means which will in all probability produce them, even though the treatment be rather protracted.

There is one point which deserves especial emphasis, and it is this: To produce lasting and permanent results by gradual dilatation the urethral canal must be brought up to the calibre of 30 or perhaps 32 F., and when this is attained the dilating process must be continued for some time, until these large sounds pass easily and without any grasping.

Continuous dilatation is very rarely resorted to at the present time. In some cases where a filiform has after a long struggle been passed through the stricture, it may be retained there for some hours or perhaps for a day, in order to render certain the passage of a larger instrument.

In the majority of cases the process of cure by gradual dilatation is uneventful, but in a small minority certain complications may arise and give more or less trouble. These complications are—1, fever and chills; 2, urethritis and urethro-cystitis; 3, a tendency to hemorrhage; 4, temporary retention; 5, rheumatism; and 6, pyæmic abscesses. It is well to state in advance that since the beginning of the era of asepsis and antiseptics in surgery these complications occur much less frequently than formerly and they are much less severe.

The occurrence of chills and fever shows that there is a low grade of suppuration in the deep urethra, but it need not cause the permanent discontinuance of dilatation. Such cases should be treated on the lines laid down for chronic anterior and posterior urethritis and urethro-cystitis. (See pages 172 et seq. and 184 et seq.)

When the sound causes inflammatory reaction, its use should be discontinued until appropriate treatment removes the tendency thereto, as it will in most cases. Exceptionally, however, it happens that the resulting inflammation is so great and so constant that it is necessary to wholly abandon this form of treatment. In many such cases judicious topical urethral medication after a time brings about such a change that the

sound may be used again. In some severe and exceptional cases the expediency of external urethrotomy will suggest itself to the mind of the surgeon.

In like manner, the tendency to slight oozing of blood after dilatation can generally be checked by the instillation of a few drops of a solution of nitrate of silver (1 : 250).

When in the course of gradual dilatation retention of urine occurs once or at intervals, it is perfectly certain that one or two causes are at work ; these are swelling of the mucous membrane in and near the stricture and temporary spasm of the compressor urethræ muscle. In such cases there is need of topical urethral medication, and the intervals between the passage of the bougies or sounds should be materially lengthened. When carefully managed this complication can be overcome.

The occurrence of rheumatism and of pyæmic abscesses indicates very clearly that, besides the stricture-process, a decided suppuration of the urethra also exists, which can be cured by the means described in the section on the treatment of chronic anterior and posterior urethritis.

It will be seen, therefore, as I have already pointed out, that in the successful employment of gradual dilatation the surgeon must be thoroughly conversant with all forms of urethral inflammation.

Strictures at and just beyond the peno-scrotal angle are frequently formed of the dense fibrous variety. In cases presenting this form of stricture gradual dilatation alone is usually an unsatisfactory treatment. In some cases in which the tissue is not very dense and is of decidedly ringed form careful stretching by means of Gouley's divulsor may be of decided benefit, and Bigelow's instrument may be guardedly used. These strictures sometimes become tolerably well dilated, and then they recontract more or less promptly ; hence they are called "resilient strictures." It is in these cases only that mild over-dilatation cautiously practised is admissible, if at all. By gentle local dilatation with a divulsor the surgeon may do away with the tendency to recontract, and then he can go on with the regular course of dilatation by steel sounds. He should never carry the procedure much if any beyond 32 F.

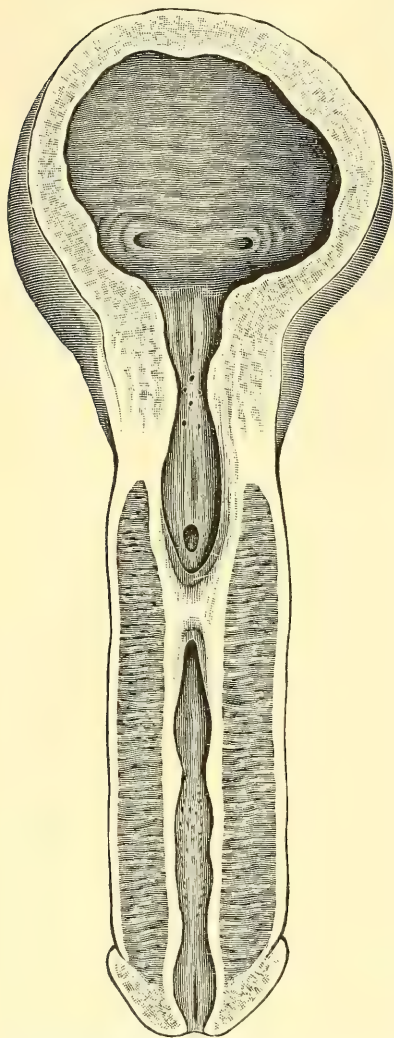
*Internal urethrotomy* in the deep urethra may be performed with certain restrictions in a limited number of cases. This procedure may be resorted to in cases of tight fibrous stricture just at and about one inch beyond the peno-scrotal junction, and perhaps at the bulbo-membranous junction if the stricture is not a very large, dense, and inodular one.

Fig. 119 will give a very clear idea of a severe case of tight stricture just beyond the peno-scrotal angle, with involvement of the greater portion of the pendulous urethra. It will be evident that in such a case dilatation by sounds would be painful and futile, and that the only procedure advisable would be to tunnel a channel by means of a cutting instrument. The oval black spot just behind the stricture shows the distal end of a false passage.

In former years internal urethrotomy by means of Maisonneuve's instrument was largely performed in cases of stricture in Region No. 1. My experience has taught me to limit its use to the fibrous strictures in the segment of the urethra just named. The patient, being healthy, having normal kidneys and not much if any bladder trouble, should be

put on moderate diet for a day or two and kept in bed, during which time the urethra, and if possible the bladder, should be well washed out several times with quite hot saturated solution of boric acid or Thiersch's

FIG. 119.



Showing dense fibrous stricture of the urethra just beyond the peno-scrotal angle, with dilatation of the bulbous, membranous, and prostatic urethra. The pendulous urethra is also much thickened and infiltrated. Walls of bladder much hypertrophied, orifices of ureters dilated. (From the Museum of the College of Physicians and Surgeons, New York.)

weak solution. The night before the operation he should have a brisk cathartic. When antisepsis can be practised there is no need for the internal use of boric acid, salol, or quinine; still, there are no objections to the employment of these drugs if the surgeon so wishes. If the patient is a weakly man, he should be prepared for some time ahead, by care as to diet and tonics, for the coming operation.

Ether narcosis having been produced, the genital parts should be shaved and rendered aseptic (soap and water, alcohol and ether, and bichloride solution). Then the filiform guide of the Maissonneuve instrument should be passed according to directions already given, and followed by the grooved conductor and the knife. Before every internal urethrotomy, just at the time of use, the surgeon should pass the cutting part of the instrument down the grooved conductor, in order to be absolutely certain that there will be no impediment. If the soft French filiform should kink or curl up and come back, the surgeon should screw on the eyed or tunnelled tip. Then, having passed a long whalebone filiform, he should slip the eye of the conductor over this guide, and then cause the instrument to glide slowly into the bladder. Always before adjusting the cutting blade of the instrument the surgeon should put his finger in the rectum, when, if everything is all right, he will feel the conducting staff in the membranous urethra, and the end of the instrument can then be freely moved in the vesical cavity. When the urethrotomy is performed the instrument should

be held in the line of the thighs, the patient lying on his back at full length. It is never well to use a large cutting blade. Too deep incisions may be followed by hemorrhage and perhaps urinary infiltration and fever.



My custom for years has been to cut the urethra to the extent of 21 F., and on the withdrawal of the urethrotome to pass an olivary bougie, No. 21 F., with a very small opening on its extreme end, into the bladder, and to allow any contained urine to run out, and then, by means of Ultzmann's hand syringe or the soft-rubber bag, to inject five to eight ounces of warm boric-acid solution or Thiersch's solution, and there leave it. This antiseptic solution, when voided later on, thoroughly bathes the wound and is productive of much good.

The bougie-catheter<sup>1</sup> may be introduced again in about four days, and then the bladder should be injected again. With the urethra thus enlarged gradual dilatation may soon be commenced, and should be carried on until a calibre of 30 F. is produced. After that it is well to introduce the sound at intervals of a week, a fortnight, or a month, and perhaps several months, as the progress of the case indicates.

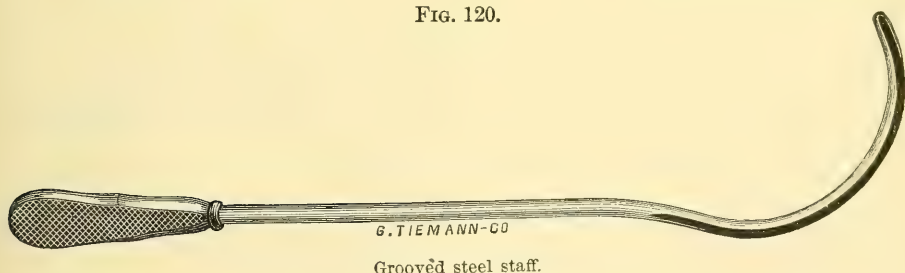
Internal urethrotomy thus performed in appropriate cases will not be attended with suffering or disaster to the patient, and will, if properly followed up, be productive of great benefit.

Until twenty years ago the operation just described was quite generally practised in America for all deep-seated strictures. But gradually the bad form of inodular stricture came to be treated by external urethrotomy, and to-day this is the operation of choice of most surgeons.

Since there is much confusion as to the title and scope of the various operations in the perineum for stricture and other conditions, it is well to try to present a sharply-marked division of them. These operations may be divided as follows: 1, external urethrotomy with a staff for bladder drainage, etc.; 2, external urethrotomy with filiform guide through the stricture, down to the face of which a tunnelled instrument has been passed (this is the Gouley operation); 3, external urethrotomy with the staff passed down to the stricture without a guide through it (this is the Wheelhouse operation); 4, external urethrotomy without any instrument in the urethra, the membranous portion being incised (this is generally known as Cock's operation or perineal section).

*External Urethrotomy for Drainage, etc.*—This operation is, as a rule,

FIG. 120.



very simple in its performance, since there is usually no impediment to the passage of the staff. The patient having been prepared and etherized, the perineum is shaved and the genito-anal region rendered surgically aseptic, the patient being in the lithotomy position, the ordinary

<sup>1</sup> Made for me by J. Ellwood Lee Co., Conshohocken, Pa.

staff for median lithotomy is passed into the bladder. The scrotum is held up by an assistant, who also holds the staff and causes its grooved convexity to bulge out the perineal tissues. The surgeon then with a scalpel carefully incises, to the extent of two inches, layer after layer until the urethra is reached and opened longitudinally about three-fifths of an inch or an inch. Then the bladder may be washed out, and the large catheter or perineal tube inserted and retained. This operation is also performed for the removal of calculi lodged in the membranous or prostatic urethra and of prostatic concretions, and for the digital exploration of these parts, the vesical orifice, and adjacent tissue. By the older surgeons this operation was called the "boutonnière."

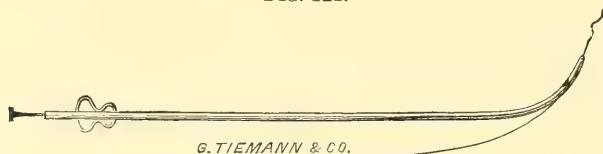
Gouley's tunnelled sound or catheter, or in an emergency an ordinary steel sound, may be used as the guide.

Gouley's and Wheelhouse's operations are generally performed for the relief of inodular strictures near and at the bulbo-membranous junction, and less frequently for fibrous strictures the result of traumatism, or soon or immediately after the damaging or rupture of the urethra from accidents which lacerate or cut through the bulbous or membranous portions of the urethra.

*Gouley's Operation.*—The operating table must be in front of a window admitting plenty of light, and the surgeon should allow himself fully two hours of sunshine, since the operation may be much protracted. The patient having been prepared and etherized and the genitals shaved, the parts are well scrubbed with soap, water, and brush, and then flushed. Then they are well rinsed with alcohol and ether, followed by a copious flow of bichloride solution (1 : 1000).

The patient should lie flat on his back (so that the perineal raphé is perfectly vertical), and held in the lithotomy position either with anklets and wristlets, the crutch, or with cotton bandages. Before commencing the operation the surgeon, seated on a low stool, examines with his finger in the rectum the membranous urethra and the prostate, and familiarizes himself with their condition.

FIG. 121.



Tunnelled catheter staff, showing the conductor in the terminal canal and the stylet a little withdrawn.

FIG. 122.

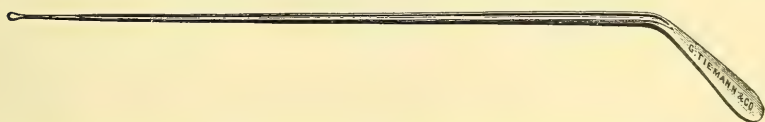


Tunnelled catheter staff with eye on the concave side.

The long filiform having passed through the stricture into the bladder, the tunnelled catheter staff (see Figs. 121 and 122) is carefully slipped over

it, and by it guided down to the face of the stricture. An assistant now carefully and firmly holds the end of the staff between the thumb and the fore finger exactly in the median line and a few inches above the pubes and hypogastrium, while at the same time he elevates the scrotum and preserves the vertical direction of the perineal raphé. If the urethra is not too deep, and if the perineum is not too much thickened with inflammatory exudation, the assistant may by gentle upward pressure on the staff, by means of his middle finger underneath it, make the tissues tense, and by this means clearer indications are given to the surgeon as to the precise position of the staff and the urethra. The surgeon then makes an incision leisurely dividing layer after layer of the tissues in the median line from the base of the scrotum to within an inch of the anus, being about two or three inches in length and involving only the skin and superficial fascia. The dissection having been carefully carried down to the urethra, the surgeon feels for the groove in the curved portion of the staff with his finger-nail. He then enters the urethra, his knife being held at right angles, and cuts slowly and carefully downward about an inch, meanwhile taking care that the filiform guide is not cut. It is very important to make a good clean cut into the urethra by a continuous stroke, the knife not being withdrawn until the full incision is made, otherwise the canal may be cut in several places. Hemorrhage is usually moderate, and is readily controlled by clamps. When the urethra is opened a ligature two feet long is passed through each cut edge, and then tied at the end. Thus we have two retractors, which are held with gentle tension by two assistants, which take up no space in the wound and which allow full inspection of the field of operation. At this time the staff is withdrawn a little, so as to bring into view the black guide, alongside of which the small grooved probe, which should be gently curved upward toward its tip in accordance with the terminal half of the subpubic curve, should be passed into the bladder. Then in this groove Gouley's beaked bistoury is passed, and

FIG. 123.



Arnott's small grooved silver probe with a broad handle, which can be bent to any angle.

the stricture is incised on its upper wall, care being taken to go well through the dense stricture-tissue, but not into the connective tissue

FIG. 124.



Gouley's beaked bistoury.

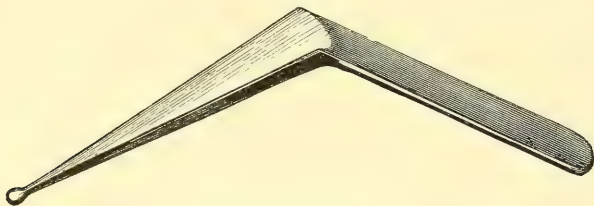
beyond. The probe is now turned so that its groove looks downward, along which the beaked bistoury is again passed, and the lower wall of the stricture is carefully incised (usually a little less deeply than the upper wall).



It is always well to take care, when the urethra is opened and the parts exposed, not to let the guide slip out or to withdraw it until the grooved probe is well in the bladder and the incision of the upper wall of the stricture has been made. Then the surgeon is master of the situation, and the guide may be withdrawn. In some cases the stricture-tissues are so densely fibrous and extensive that after a preliminary slight cut with the beaked bistoury the operation may be completed more satisfactorily by means of a blunt-pointed straight bistoury.

When the stricture-tissue has been incised Teale's probe gorget is an

FIG. 125.



Teale's probe gorget.

exceedingly useful instrument, particularly to persons not very familiar with the operation. By its passage the parts may be much dilated, and by this means much aid is given the timorous surgeon who fears to cut too deeply. By means of the probe gorget the catheter or perineal tube is then passed into the bladder, which should be well washed out with hot boric-acid water.

The catheter or perineal tube used in this operation should be quite large, and should be adapted to the calibre of the incised canal. As a rule, tubes from 30 to 35 F. should be introduced. The aim of the

FIG. 126.



Perineal tube.

surgeon now is to allow the urethral tissues and the ambient tissues, which have previously been much congested, to drain, and also to so act upon the urethra by as much dilatation as possible that absorption may be produced and a canal with a satisfactory lumen shall be left. To this end I always, if possible, allow the tube to remain in the wound at least fourteen days, taking care that the bladder is well washed out several times daily, and applying such topical treatment as may be necessary. I think that the early closure of the perineal wound robs the patient of much of the benefit he should derive from the operation.

The catheter is retained in the wound by passing through it at right angles a large safety-pin. The patient having a T-bandage around the waist, from it two long pieces of gauze pass down, one on each side of the scrotum, and then they are fixed, one on each end of the safety-pin. By this method of adjustment the catheter can be readily removed and cleaned at any time; which is a great desideratum, whereas if it is held by a ligature which passes through the edges of the wound, removal is

difficult and painful. The wound around the tube is carefully packed with iodoform gauze, over which are placed layers of absorbent cotton and gauze, which are held in place by a retentive bandage. The catheter is connected by means of a glass coupling to a long India-rubber tube (calibre 30 F.), which passes to a large bottle suspended to the side of the bed, which should always be half filled with 1:20 carbolic-acid solution.

Now-a-days, with our more perfected technique and antiseptic measures, it is very rare to see any bad results follow external urethrotomy. There may be a very slight and ephemeral rise in temperature, but only in very bad old cases with vesical and renal complications do we see urinary fever and sepsis; and these complications are much rarer than they were in former days. Hemorrhage is, as a rule, infrequent after this operation, as performed now-a-days, and is readily controlled by the pressure exerted by packing the wound quite tightly.

In some rare cases healing is so prompt that the tube cannot be retained longer than a week. Some nervous subjects fret and complain and cause us to remove the tube before it is expedient. As I have said before, the benefits resulting from the operation are materially increased by keeping the tube in the urethra for at least a fortnight.

*Syme's Operation.*—What is known as Syme's operation is practically the one already described, except that the instrument used in the urethra is Syme's staff. This instrument is grooved for half an inch at the distal part of its straight portion which is joined by the curved part, which is also grooved. This curved portion at its commencement is of size No. 8 F., and at its tip it is 4 French in calibre. This long, thin curve makes the instrument very difficult to properly introduce into very tight strictures, even in skilled hands, and it has been known to cause death by making false passages. So, while it is well to be familiar with Syme's staff on account of its history, it is not well to employ it now that we have the tunnelled catheters.

*External Urethrotomy without a Guide through the Stricture.*—When the patient is fully etherized a last attempt should be made to pass a filiform. This failing, we operate without the great aid of this guide. This operation is performed with the aid of a staff invented by Mr. Wheelhouse of Leeds, and is known by the name of that surgeon. The main features of this operation are similar to those of Gouley's method, but its technical points will be here described: The staff (see Fig. 127) is fully grooved through its greater part, except the last half inch, where it stops abruptly and terminates in a rounded button-like end.

FIG. 127.



Syme's staff.

Mr. Wheelhouse<sup>1</sup> gives the following details of his operation :

"The staff is to be introduced with the groove looking toward the surface and brought gently into contact with the stricture. Whilst an assistant holds the staff in this position an incision is made into the

FIG. 128.



Wheelhouse's staff.

perineum, extending from opposite the point of reflection of the superficial perineal fascia to the outer edge of the sphincter ani. The tissues of the perineum are to be steadily divided until the urethra is reached. This is now to be opened *in the groove of the staff, not upon its point*, so as certainly to secure a quarter of an inch of healthy tube immediately in front of the stricture. As soon as the urethra is opened and the groove in the staff fully exposed, the edges of the healthy urethra are to be seized on each side and held apart. The staff is then gently withdrawn until the button-point appears in the wound. It is then to be turned around, so that the groove may look to the pubes, and the button may be hooked into the upper angle of the opened urethra, which is thus held stretched open at three points—at two by the forceps, and at the third by the hook of the staff. The operator looks into it immediately in front of the stricture, inserts the director into the urethra, and, if he cannot see the opening of the stricture, which is often possible, generally succeeds in very quickly finding it, and passes the point onward *through* the stricture toward the bladder. The stricture is sometimes hidden among a crop of granulations or warty growths, in the midst of which the probe-point easily finds the true passage. The director having been passed on into the bladder (its entrance into which is clearly demonstrated by the freedom of its movements), its groove is turned *downward*, the whole length of the stricture is carefully and deliberately divided on its under surface, and the passage is thus cleared. The director is still held in the same position, and the straight, probe-pointed bistoury is run along the groove to ensure complete division of all bands or other obstructions. These being thoroughly cleared, the old difficulty of directing the point of a catheter through the divided stricture is to be overcome. To effect this, the point of the probe gorget is introduced into the groove of the director, and, guided by it, is passed onward into the bladder, dilating the divided stricture and forming a metallic floor, along which the point of the catheter cannot fail to pass securely into the bladder."

Works on surgery, as a rule, give the reader the impression that this operation without a guide through the stricture is in general simple and that the bladder is quite readily reached. In many cases this is true, but in many others much time, patience, and skill is required to overcome the difficulties which present themselves. It is always well for the surgeon to keep cool, to be patient, and not to be in a hurry. Then the next and the prime essential is to have his anatomical knowledge well in hand. The damaged urethra which he wishes to traverse

<sup>1</sup> *British Med. Journal*, June 24, 1876.



is seated one inch below the pubic arch and midway between the ascending rami of the ischia. The canal forms a gentle curve upward. Therefore, it is well to keep in the middle, to remember that the bulbous urethra has been opened, and that the search should not be made too high up or too low down.

By means of the grooved probe or of filiforms the surgeon endeavors to get through the narrowed channel, and he may sometimes be two or three hours in doing it. If the grooved probe can be passed, the operation is practically done. If the surgeon succeeds in passing a filiform, he may by gentle manipulation pass a small tunnelled catheter or perhaps Fluhrer's urethrotome over it into the bladder, and then the parts can be properly incised.

In some cases the little procedure recommended by Wheelhouse, of hooking the button of the staff in the upper end of the wound, and thus by traction, aided by the lateral-ligature retractors, getting a clear view of the field of search, works well, and really opens or distends the urethral orifice. In other cases, however, this method so deranges the topography of the parts that the urethra is made more inaccessible.

When the bladder has been reached the subsequent steps of the operation are the same as those followed in the Gouley operation.

In the rare cases where the surgeon has failed to traverse the urethra it is well to let the patient come out of the ether narcosis, and after a time (during which his urine has been accumulating) to put him on the table again in a good light; then, the edges of the wound being held apart by small retractors, the patient is told to urinate, and the surgeon watches the spot from which it oozes. Finding that, he can probably get to the bladder by means of the probe or a filiform.

*External Urethrotomy without a Guide (Cock's Operation or Perineal Section).*—For the very worst and most desperate class of cases in which, either as a result of chronic stricture or of traumatism, the urethra anterior to the triangular ligament has been obliterated, or in which the stricture is impassable to instruments, the operation known as Cock's operation, perineal section, and external urethrotomy without a guide may be necessary. This operation is so clearly described by Mr. Cock<sup>1</sup> that I transcribe his words:

"The only instruments required are a broad double-edged knife with a very sharp point, a large silver probe-pointed director with a handle, and a cannula or female catheter modified so that it can be retained in the bladder.

"The patient is to be placed in the usual position for lithotomy, and it is of the utmost importance that the body and pelvis should be straight, so that the median line may be accurately preserved. The left fore finger of the operator is then introduced into the rectum, the bearings of the prostate are carefully examined and ascertained, and the tip of the finger is lodged on the apex of the gland; the knife is then plunged steadily but boldly into the median line of the perineum, and carried on in a direction toward the tip of the left fore finger, which lies in the rectum. At the same time, by an upward and downward movement, the vertical incision may be carried in the median line to any extent

<sup>1</sup> *Guy's Hospital Reports*, 1866.

that is considered desirable. The lower extremity of the wound should come to within half an inch of the anus.

"The knife should never be withdrawn in its progress toward the apex of the prostate, but its onward course must be steadily maintained until its point can be felt in close proximity to the tip of the left fore finger. When the operator has fully assured himself as to the relative position of his finger, the apex of the prostate, and the point of the knife, the latter is to be advanced with a motion somewhat obliquely either to the right or left, and it can hardly fail to pierce the urethra. If in this step of the operation the anterior extremity of the prostate should be somewhat incised, it is a matter of no consequence.

"The knife is now withdrawn, but the left fore finger is still retained in the rectum. The probe-pointed director is carried through the wound, and, guided by the left fore finger, enters the urethra and is passed into the bladder. The finger is now withdrawn from the rectum, the left hand grasps the director, and along the groove of this instrument the cannula is slid until it enters the bladder.

"The operation is now complete, and it only remains to secure the cannula in its place with four pieces of tape, which are fastened to a girth around the loins. A direct communication with the bladder has now been obtained, and the relief of the patient will be immediate: unless the kidneys have become irremediably disorganized, we may confidently anticipate a favorable result and the restoration of the urinary organs will be more or less complete in proportion as the obstructed portion of the urethra is more or less amenable to the ordinary judicious treatment of stricture. The cannula may generally be retained in the bladder for a few days, and, if the state of the urine renders ablution necessary, the viscus may be frequently washed out. The cannula may then be removed, cleansed, and reintroduced. A flexible catheter is sometimes more desirable and congenial to the feelings of the patient than a metallic cannula.

"If the previous destruction has not been very great, and if the case progresses favorably, the swelling of the perineum and scrotum gradually subsides, the induration disappears, and the urinary sinuses become obliterated. The urethra may be examined in the ordinary way to test its permeability, and one may be agreeably surprised to find that the sound or catheter readily passes through the former stricture until it strikes against the cannula. An attempt may then be made to introduce a flexible catheter into the bladder, and its passage may, if necessary, be facilitated by passing a director through the perineum into the bladder and guiding the catheter along its groove. The urethra once restored to its normal condition and calibre, the artificial opening through the perineum soon heals up, and, barring the liability of stricture to return if not attended to, the cure may be said to be complete."

*Excision of Stricture-tissue with Transplantation of Mucous Membrane.*—This operation has been performed within the past ten years, but it is still in its experimental stage, and as yet no conclusions can be drawn as to its ultimate results and its worth. It has been employed in cases of traumatic stricture and in those in which the inodular infiltration invades the parts much beyond the urethra. In an article giving

the literature of the subject Keyes<sup>1</sup> details a case on which he operated with moderate success.

**Electrolysis.**—This method of treating stricture need only be mentioned to be condemned. Its consideration is not worth the time and space it would require. A moment's thought of the pathological condition to be treated in stricture of the urethra, and of the mode of action of this electro-chemical method of decomposition, will convince any one of its futility, even harmfulness if thoroughly used. The aim of this treatment is to decompose the newly-formed morbid tissue and to produce its absorption. Now, electrolysis has not an electro-affinity for the stricture-tissue, leaving the mucous membrane unaffected, but, on the contrary, acts upon this membrane and destroys it; and whenever the mucous membrane lining a stricture is destroyed there is a grave probability that the urethra will be obliterated.

It is probable in many cases in which some surgeons have claimed beneficial results from electrolysis that this agent did not exert its peculiar decomposing power, but simply acted as a stimulant, which may have, aided by other measures, tended to cause the absorption of some mild, soft stricture.

**Treatment of Retention of Urine.**—In every case of retention it is necessary to consider the age of the patient and to obtain his medical history as relating to the genito-urinary organs.

Young men in the declining stage of acute gonorrhœa are sometimes seized with retention of urine due to mucous-membrane swelling and perhaps compressor spasm. In this case it is always necessary to remember that filiform and small catheters may do much harm, and will produce no benefit. The surgeon should take a No. 18 or 20 F. flexible blunt or olivary catheter and slowly pass it into the bladder. If at the bulb or posterior to it he meets an obstruction, he should not use violence and he should not be in a hurry. Gently pressing the end of the catheter against the obstruction, he holds it there and waits, and usually in a few minutes it will slowly pass into the bladder. If this is not accomplished at once, the patient may be placed in a hot bath, and ten or fifteen drops of laudanum well diluted in water may be given to him. As a rule, this course will be followed by the passage of the catheter and the patient's relief. In these cases the posterior urethra is in all probability invaded, and the urethral trouble will not be materially made worse even if it is necessary to pass the catheter several times.

In older subjects retention usually results from urethral stricture. Having ascertained the patient's history, the surgeon passes to the face of the obstruction a flexible catheter about 20 F. By this he can gain knowledge of the nature of the obstruction. If a narrow stricture is present, it is well to try to get through with the English catheters of very small size, which have such stability that they will frequently pass where the French ones fail.

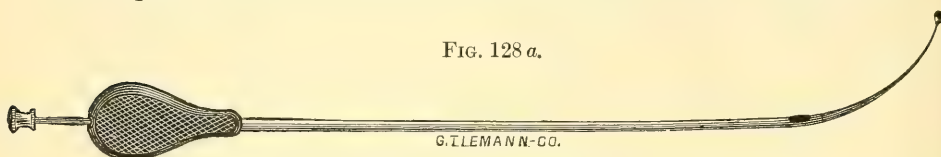
Thompson's retention catheter, when skilfully handled, sometimes produces brilliant results in the relief of retention. Unskilfully used, it is a dangerous instrument. Bumstead's retention catheter, which has a French filiform flexible guide, may be kept ready for use, since by it

<sup>1</sup> *Journal of Cutaneous and Gen.-urin. Diseases*, 1891, vol. ix. pp. 401 et seq.



the surgeon may sometimes reach the bladder when he has almost begun to despair. For the use of filiforms in retention due to stricture the

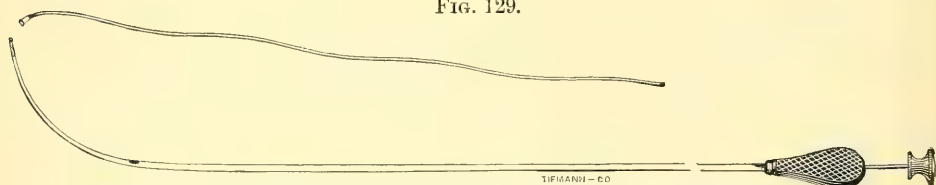
FIG. 128 a.



Thompson's retention catheter, with malleable silver probe-point.

reader is referred to the section thereon. (See p. 355.) Having traversed the stricture with the filiform, it can be the means of guiding a small Gouley catheter staff into the bladder.

FIG. 129.



Bumstead's retention catheter, with screw-point so that it may be attached to any filiform bougie employed with rupture or incision instruments.

The passage of instruments for prostatic obstructions has been considered (see page 360), and the directions there given will hold good in case retention of urine is present.

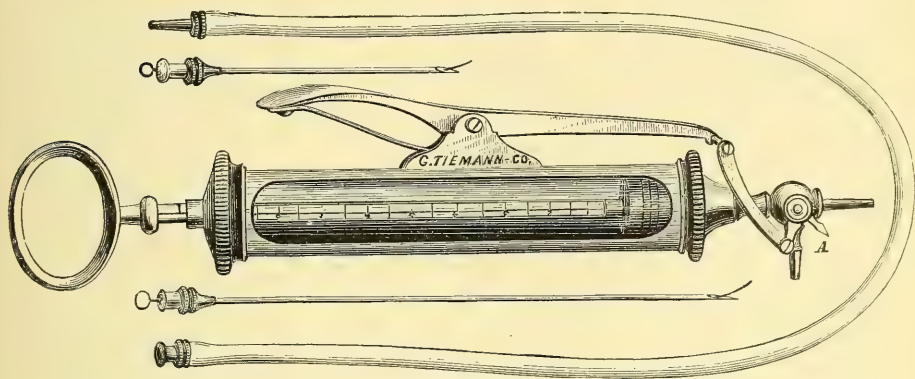
It is necessary here to warn young surgeons not to fully empty the bladder in elderly and old men who are suffering from retention due either to stricture or prostatic hypertrophy. At the first attempt at relief if the bladder is very full and protuberant, about a pint of urine may be drawn off, and before the catheter is withdrawn half a pint of warm boric-acid water should be injected into the bladder. When the distressing symptoms are again felt, a similar withdrawal and an injection should be made. In this way in the course of twenty-four or thirty-six hours the patient can be much relieved. In old stricture and prostatic cases there is always a certain amount of residual urine; consequently it is the surgeon's duty to ascertain its quantity, and always after the final catheterism for relief of retention to leave a similar amount of boric-acid water in the bladder. Failure to carry out this cautious and slow method of catheterism may result in serious bladder and kidney lesions, and perhaps in death. When all urine is suddenly drawn from the bladder in those cases where there has been more or less intense vesical, urethral, and kidney congestion, the vessels at first become suddenly exsanguinated; then, when the circulation is re-established, hemorrhage occurs into the kidneys and bladder, and death ensues.

In very urgent cases of retention of urine from stricture, particularly in middle-aged and elderly men, or of prostatic hypertrophy in which the surgeon fails to reach the bladder with a catheter, it may be necessary to draw off the urine by means of the aspirator. For this purpose the instrument of Emmet is very serviceable.

In performing aspiration it is important that the pubes should be

shaved and rendered surgically clean. Then the instrument should be tested before use, and it should be made certain that the needle is pervious. It is then sterilized. The area of operation is about one inch above the upper margin of the symphysis pubis, and at most one inch on each side of the median line. In this restricted field, if proper care and caution are exercised, many punctures are made, and by them sufficient time may be gained to allow the urethra and prostate to lose much of their engorgement and to permit the passage of catheters. In

FIG. 130.



Emmet's aspirator.

many cases as many as four punctures of the bladder daily for six and eight days may be made with local benefit and without any untoward symptom whatever.

On the withdrawal of the aspirating needle suction should be kept up until its point is well out of the wound. Otherwise, some of the urine (and it is usually of septic character) may escape into the cellular tissues and produce an abscess.

In very rare cases the upward growth of the prostate is such that it shuts off the bladder from approach above the pubes, in which event the aspirating needle cannot reach the vesical cavity.

URETHRAL FEVER, OR URINARY INFECTION.—Following operations upon the urethra and bladder for stricture, cystitis, vesical neoplasms, calculus, retention, and prostatic hypertrophy, particularly in chronic cases of young men and in men approaching middle age and in old men, certain febrile disturbances of mild or severe character and septic infectious conditions are sometimes observed, which have been variously called urethral fever, urinary fever, catheter fever, urinary poisoning, and urinary infection.

After such simple operations on the urethra as the easy passage of a bougie or catheter, incision of the meatus, and even the introduction of the meatus sound, some patients become faint, pale, and may lose consciousness. This condition is simply a mild form of shock, and is analogous to the fainting spells following blows on the testes or cord or the subcutaneous ligature of the spermatic veins. In some cases these symptoms are mild and very ephemeral, while in others they are more

severe and prolonged. Though these conditions are generally considered under the head of urinary fever, they are in no sense related to that condition. They are the evidence of reflex nervous action.

After instrumental operation on the urethra patients may have a slight rise in temperature, preceded or followed perhaps by a chill, which passes off and does not recur. This condition may be observed in some cases with the passage of the first urine after urethrotomy, tight catheterization, or divulsion. This condition represents the mild and ephemeral form of urethral fever. In it the patient is only mildly sick.

The second form is that which is called "acute urethral fever," in which the chill is severe and often prolonged, the rise in temperature sudden ( $104^{\circ}$  to  $106^{\circ}$  Fahr., and even beyond this), and in which the systemic symptoms are correspondingly severe. In some cases deferescence is ushered in with sweats. This condition may last one or several days, and it may recur at intervals. The patient is usually a quite sick man.

This second form may cease or it may become chronic, and it is then called "chronic urinary fever." This is mostly observed in elderly and old men suffering from stricture, and its pathological sequences in the membranous and prostatic urethra, bladder, and perhaps kidney, and also in cases of prostatic hypertrophy, calculus, and vesical neoplasms.

The fever is of a mild type, perhaps continuous, and again it may be intermittent. During its course irregular slight chills or severe rigors may be experienced. This condition is indicative of grave trouble of the whole urinary tract, and it tends to undermine the patient's health. Persons thus affected lose flesh, become sallow, suffer severely from dyspepsia, and gradually lose ground, until they die either from uræmia or septicæmia.

Urinary infection with fulminating lethal symptoms has sometimes been observed. In the classical case of Banks a man broken in health and suffering from tight stricture, who was catheterized without violence, pain, or bleeding, was immediately after the operation seized with a severe rigor, passed into syncope, and died in a few minutes. In another case reported by Banks<sup>1</sup> the stricture in the pendulous urethra was long and tight. It had been mildly dilated, and six and a half hours after the passage of a No. 4 E. sound the man suddenly collapsed and died.

Thompson reports two cases in which death followed in twenty-four and forty-eight hours after the passage of a small instrument through tight strictures.

In most of the very severe cases there is suppression of urine.

The pathology of urinary infection has been studied by many observers, particularly by the *élèves* of Guyon,<sup>2</sup> and, although absolutely full and definite statements cannot be made, considerable can be said.

The underlying primary cause of urinary fever is some inflammatory focus in the urethra and bladder. When this condition is well marked and chronic, and the bladder is decidedly affected and the urine septic, then the patient is liable to urinary infection. If the pathological changes are as yet not far advanced, the results of instrumental manipulation in

<sup>1</sup> "On Certain Rapidly Fatal Cases of Urethral Fever after Catheterism," *Edinburgh Med. Journal*, June, 1871, p. 1074.

<sup>2</sup> Hallé, *op. cit.*



disturbing them are mild and show themselves by the ephemeral form of fever. When the changes are more chronic and deep-seated, the tissues react more violently and the fever is more severe.

In the grave order of cases there is always coexisting renal impairment. Now, on this pathological basis as a result of damage, even mild, done in operation, certain microbes seem to luxuriate, and they secrete the poison which gives rise to the inflammatory and septic phenomena already described. An attentive reading of the results of the various investigators seems to show that the chief morbid agent in urinary poisoning is the bacterium coli commune. We cannot say definitely where this microbe breeds and has its being—whether it is in the affected tissues or in the urine, probably in the latter, and perhaps in both. It seems certain that without tissue-disturbance and trauma this micro-organism may remain dormant, but that when the condition of the tissues has become altered by loss of epithelium and other unknown states, it becomes hostile and produces urinary poisoning. On this point the following carefully observed case, reported by Achard and Hartmann,<sup>1</sup> throws much light:

A prostatic patient incompletely emptying his bladder for several years was attacked by retention, which necessitated catheterism, which at first was difficult and attended with a flow of blood. For twenty days this was done regularly; then the patient was allowed to urinate unaided, which he did easily. Shortly after he was attacked with a chill, fever, and sweats. The catheter was then used and no fever was observed. A month later no bad symptoms were noted, even though the patient passed the first few drops of urine naturally. He was then allowed to urinate spontaneously, which he did readily, but as a result suffered from the same symptoms. Eight days later, to satisfy his curiosity, he passed his urine normally, and in a few hours had a mild fever again. Urine drawn aseptically from his bladder and deposited upon various culture-media produced a microbe having all the appearances of the bacterium coli commune. The case shows that simple traumatism by the catheter was insufficient to produce an attack of fever; that absorption of the septic material took place at the part of the urethra damaged by the distention of the urinary flow; and that the infecting agent was the bacterium coli commune, which was found in a state of purity.<sup>2</sup>

In many patients this microbe seems to hibernate, and does not become pathogenic even when there is much tissue-damage (they seem in a measure immune to its action), while in others the slightest trauma seems to be the starting-point of its virulence and its wildfire-like spread. Perhaps in some patients the nature of the microbe is weak, and it is imperfect in its development. It is a significant fact that in all very grave cases there is more or less presumptive or conclusive evidence of renal derangement. The urethral and vesical disturbances then seem (how we

<sup>1</sup> *La Semaine médicale*, Jan. 25, 1892, and *Annales des Malad. des Org. Gén.-urin.*, April, 1892, p. 299.

<sup>2</sup> Krögius ("Bacterium Coli dans l'Infection urinaire," *Arch. de Méd. exp.*, No. 1, 1892) says that as a result of the examinations of seventeen specimens of pathological urine, antiseptically obtained, he is certain that the coli bacillus is the infecting agent. The bacterium of Clado, the bacterium pyogène of Albarran and Hallé, present with this bacterium the greatest analogies of polymorphism of culture and of pyogenic and toxic qualities.

Finally, the bacillus of Escherich is the same micro-organism as the French authors term *bactérie pyogène*.

cannot exactly say) to react promptly on the kidneys, and as a result we have the mixed conditions of urinary infection and of uræmia, and more or less total suppression of urine.

While we can thus speak with considerable certainty as to the presence, nature, and pathological action of the *bacillus coli commune*, we are as yet in the dark as to the rôle of the pathological action of the pyogenic microbes which are also found in pathological urine and in the genito-urinary tract.<sup>1</sup>

The practical lesson to be learned from all these researches is to do as little violence to urethral and vesical tissues as possible, and to be thorough in the matter of asepsis and antiseptics. It can be readily seen that drugs taken internally cannot efficiently act upon the morbid conditions of the tissues or on the microbes and their poisons contained in the urine.

**Treatment of Extravasation.**—The general principles upon which the treatment of extravasation of urine is to be conducted are—to give free exit by incisions to the escaped fluid and disorganized tissues; to support the vital powers by nourishment and stimulants; to remove and render inert the noxious products of decomposition by cleanliness and antiseptics. At the earliest moment that any external symptoms of extravasation can be detected—nay, before this, if constitutional shock and deep-seated pain lead to the suspicion of the escape of urine, although its presence behind the deep perineal fascia be indicated by no sign appreciable upon the surface—a free incision should be made in the median line of the perineum, where there is little danger of wounding important vessels. When the extravasation has attained more superficial parts, numerous incisions are required in the scrotum and wherever else there is distention and a tendency to sloughing or gangrene.

We are generally called upon to sustain the sinking powers of life by the free exhibition of nourishment and stimulants, as beef-tea, brandy, milk-punch, carbonate of ammonia, quinine, etc. Opium is of much value when there is much pain or nervous irritability. Nothing can be done for the relief of the stricture during the continuance of the shock consequent upon rupture, but usually, as this passes off, catheterism may be successfully performed. In case this cannot be accomplished, and if the bladder be found on percussion to be still distended owing to the small size of the rupture, it is desirable to resort to puncture at once or to extend the

<sup>1</sup> As to the frequency and relative importance of the different microbes much has yet to be learned. Thus far, different fields of observation have been studied. Rovsing collected cases at random from a general hospital; Hallé got his cases in the Neckar, a special urinary hospital. It is fair to assume that the microbial character of pathological urine may vary according to the place and general conditions (and according to the disease which may have preceded the cystitis).

There is no special specific organism of the urinary apparatus. Probably many common forms which may exist as saprophytes only become virulent after successive cultivations in the human bladder. Thus can be explained the multiplicity and irregular reappearance of pathogenic microbes.

Though the list is long, the number of microbes known to be truly infecting is not large. Staphylococci and streptococci can undoubtedly cause suppurating nephritis and general febrile infection. Hallé says that, according to his observations, these pyogenic microbes are not the ones ordinarily the cause of the general infection due to bladder inflammation. Their action is exceptional, and to them may be attributed the rare cases of purulent infection with multiple abscesses which are out of the usual category of urinary fever. Anatomical and pathological examination of urinary infection in man thus far has only shown that this condition is produced by—1, the microbes of suppuration; 2, the *bactérie pyogène*.

incision in the perineum to the urethra behind the obstruction. The discharge is fetid and ammoniacal from the first, and especially so as the disorganized tissues are cast off by suppuration; hence frequent hot irrigations with the various antiseptic solutions, followed by the application of iodoform and absorbent gauze tampons, are necessary.

**Treatment of Urinary Abscess and Fistula.**—Urinary abscess may arise from ulceration of the urethra and consequent escape of urine, often in minute quantity, into the cellular tissue, in which case it communicates with the canal from the outset; or it may be produced by simple irritation of the neighboring parts, and, although isolated at first, eventually open into the urethra. In both cases the sooner the abscess is evacuated by external incision the better—in the former, in order to quiet the constitutional disturbance which ordinarily ensues, and prevent the extension and burrowing of matter; in the latter, to effect the same purpose, and also to avoid, if possible, any lesion to the urethral walls and the formation of urinary fistulæ; for when once the urine has found an abnormal outlet, it acts as a constant irritant, and renders difficult the closure of the passage either by nature or by art. When matter is pent up behind the triangular ligament, it is often exceedingly difficult to detect its presence by external examination: there is usually, however, even in obscure cases, some degree of hardness and tenderness on pressure, and if its existence is rendered probable by the general symptoms, as a chill, nausea, rapid pulse, etc., an incision should at once be made in the median line of the perineum in front of the anus; even if pus be not at first found, a passage will be formed for its subsequent exit and the tension of the parts will be relieved. In some exceptional cases urinary abscess assumes a chronic character and is attended by little febrile excitement or inconvenience; thus, a small tumor formed by an abscess communicating with the urethra sometimes exists for months before being discovered by the patient or surgeon, unless a careful examination of the perineum be made.

*Urinary fistulæ*, in most cases, contract and close spontaneously when the stricture has been thoroughly dilated, especially if the general condition of the patient be maintained at a proper standard of health. Assistance may be derived from stimulating applications to the sinus, as of nitrate of silver, tincture of iodine, or carbolic acid. The end of a probe may be coated with nitrate of silver and passed along the fistulous track; one of the liquids just mentioned, either pure or diluted with water, may be injected, and plugs of absorbent gauze be inserted. The method, however, I have found to be most successful is first to thoroughly cauterize the fistula, and then pack it with balsam-Peru gauze, then wait for a few days, after which the urine is drawn off with a soft catheter every time the desire to pass water is felt, and the patient should be taught to do this for himself.

Fistulæ in front of the scrotum frequently require plastic operations.

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## CHAPTER XXXIII.

## BALANITIS AND BALANO-POSTHITIS.

WE apply the term "balanitis" to inflammation of the mucous membrane covering the glans penis, and "posthitis" to inflammation of the mucous lining of the prepuce. Either part may be affected separately, but when both surfaces are involved the affection is called "balano-posthitis." By many, however, the term "balanitis" is used to mean inflammation of the mucous membrane of either the glans or the prepuce, or both.

This affection is most commonly seen in persons having some abnormality of the prepuce, such as smallness of its orifice, straightness, tightness, and redundancy, and shortness of the frænum. It is also seen in persons having a normal penis and in those whose prepuce is very short. In most cases it shows a tendency to relapse, and one attack predisposes toward subsequent ones. It exists in an acute and a chronic form, and in all degrees from mild to very severe. As remarked by Fournier, balanitis is a spontaneous, personal, and non-venereal affection in the majority of cases.

In its most simple form balanitis presents a very red, somewhat thickened surface, covered with a milky secretion emitting a penetrating and offensive odor. This condition is very amenable to treatment.

Balanitis and balano-posthitis in a more advanced form present well-marked features. The glans and prepuce are swollen, and when the latter is retracted a mottled surface of shining whiteness, broken by deep-red superficial and irregular excoriations, is seen. In this case in some parts the epithelium still remains, and, having been macerated by the secretions, presents the whitish-pearly look spoken of, while in other parts it is cast off, and as a result the red excoriated patches are left.

In other cases upon retracting the prepuce it is found that the glans or its covering, or both, are the seat of redness and swelling, and that their surface is covered with minute, closely-packed vesicles, which rupture promptly and give rise to excoriations.

The foregoing, which we may call the simple forms of balanitis and balano-posthitis, may be promptly cured by appropriate medication. But should, for any reason, the irritating cause persist, a more severe form of the affection results. With the increase of the redness and swelling the excoriations give rise to exulceration, which may be superficial and covered with thin, soft greenish crusts, and which is called "exulcerated balanitis" or "balano-posthitis." Under unfavorable circumstances these superficial lesions of continuity may become transformed into deeper ulcers, very often undistinguishable from chancrels.

Balanitis is not infrequently seen in persons having a short prepuce, which tends to curl up in a little bunch behind the corona glandis—a condition very often seen in those having hypospadias. In the coronal sulcus of these cases there is sometimes found a red, raw, pus-secreting, narrow, transverse patch which is very obstinate and annoying. It usually originates in decomposition of the sebaceous matter, and shows

a marked tendency to recur in consequence of very slight inattention to cleanliness.

Under the title "circinate erosive balano-posthitis" Berdal and Bataille<sup>1</sup> describe a form of balanitis which in its configuration and course resembles ringworm of the skin, and which is considered by them to be due to some microbe not yet clearly made out. The eruption occurs on the glans and also on the prepuce in the form of segments of circles, the convexity of which points to the glans. These circles increase in area, and as they grow the tissues included in them become eroded and perhaps ulcerated. The advancing border is composed of a thin whitish ring of epithelium which is a little uplifted. Inoculation-experiments are said to have produced similar lesions. The authors claim that this form of balanitis is contracted from women—that it is infectious, and must be regarded as of venereal origin.

Cordier<sup>2</sup> reports under the title a new variety of balanitis, a peculiar form due to external irritation. The irritating agents are calomel locally applied to the glans or prepuce and iodide of potassium taken internally. The author details the case of a young man having tertiary ulcerations of the penis which were dressed with calomel; he also took the iodide, and the urine then coming in contact with the calomel produced a decidedly caustic effect with enormous swelling of the penis, atrocious pain, and much sero-purulent secretion. In this form of balano-posthitis or balanitis the pain is very severe, the secretion most abundant, the prepuce is œdematous and often covered with a pultaceous coating, which may cover up deep ulcerations. Cases thus afflicted are chiefly those having very long prepuces, which favor the retention of urine.

### Croupous and Diphtheritic Balano-posthitis.

This form of balano-posthitis was first described by Bokai.<sup>3</sup> It is usually a sequela or complication of wounds or of operations upon the prepuce. Thus I have seen it follow ritual circumcision in a young child, and in a young three-year-old boy who had with some violence retracted the prepuce and broken up some adhesions.

The clinical appearances consist in redness and swelling of the parts, with superficial excoriation, over which a whitish membranous exudation as thick as writing-paper is seated. Usually the membrane is readily stripped off, and healing will follow the observance of cleanliness and the application of a mild lotion.

Diphtheritic balano-posthitis is sometimes observed during or following diphtheria, scarlatina, measles, variola, typhoid fever, and other infectious diseases. The local affection usually originates in a simple balano-posthitis resulting from want of cleanliness and care in the removal of smegma and of decomposing urine.

The membrane in this form of balano-posthitis resembles that of diphtheria of the mucous membranes. It is of a yellowish or dirty

<sup>1</sup> *La Médecine moderne*, 1891-92, pp. 340, 380, 400, and 413, and *Annales des Malad. des Organes Gén.-urin.*, vol. viii., 1890, p. 53.

<sup>2</sup> "Sur une nouvelle Variété de Balanite," *Lyon méd.*, vol. lxiii., No. 1, pp. 5 et seq.

<sup>3</sup> "Die Krankheiten der Urogenitalorgane des kindlichen Alters," *Gerhardt's Handbuch der Kinderkrankheiten*, 4 Bd., 3 Abtheil.

grayish-white color, sometimes as thick as blotting-paper, and is with difficulty removed from the underlying parts, from which hemorrhage may be caused by the operation. The glans and prepuce are reddened and swollen, and may even become phlegmonous. In bad cases the inguinal ganglia are swollen. Diphtheria sometimes attacks the circumcision-wound in young infants.

I have seen among the low, ignorant Hebrews of the East Side deep chronic ulcers, and even destruction of the penis and death, due to diphtheritic infection of the preputial wound.

**Diabetic Balano-posthitis, also called Phimosis Acquisita Diabetica (Englisch and Leuchert) and Balano-postho-mycosis (Simon).**

In rare cases balanitis and balano-posthitis may complicate diabetes. The subjective symptoms of this form are quite similar to, but more intense than, those of ordinary balano-posthitis. The patients complain of severe, even atrocious, itching and burning sensations, comparable to those of pruritus vulvæ, and the mucous membrane looks oedematous, and of a color midway between red and violet. A profuse purulent secretion is constantly seen, together with flakes or masses of smegma and micro-organisms which look like croupous exudation. The surface of the glans and prepuce may present a number of exulcerations, and at the free border of the prepuce small radiating ulcers frequently form. In severe chronic cases vegetations appear as complications.

The **course** of the disease is essentially chronic, and as a result of the inflammation and of the ulcers at the end of the prepuce well-marked phimosis may be caused.

In very severe instances the ulcers lead to gangrene, by which more or less loss of the prepuce or glans is produced. These cases of gangrene of the penis from diabetes are sometimes very alarming in character and demand prompt and radical treatment.

In some cases the occurrence of balanitis and balano-posthitis is the first evidence of the existence of diabetes. Whenever, therefore, these conditions pointing to a local evidence of this disease are observed in persons who had previously not suffered from any trouble of the penis, particularly in those of middle or old age, the suspicion of diabetes should be entertained and a full examination made. In like manner the onset of balanitis and balano-posthitis, particularly in elderly persons who complain of symptoms peculiar to diabetes or who suffer from disseminate and patchy eczematous eruptions, from outbreaks of pustules, boils, and carbuncles, should excite suspicion as to the existence of that disease as an underlying cause.

Diabetic balano-posthitis and phimosis are not common affections, for Durand-Fardel did not observe it in 344 cases of diabetes mellitus, and Dumas, a resident physician in large practice at Vichy, only saw 2 cases.

The micro-organisms of this affection are the aspergillus and the penicillium glaucum. Friedreich,<sup>1</sup> who carefully studied the bacteri-

<sup>1</sup> "Ueber das Constante Vorkommen von Pilzen bei Diabetischen," *Virchow's Archiv für Path. Anat.*, B. 30, p. 476, 1864. In a paper by Englisch, "Ueber Erkrankungen der Vorhaut bei Diabetes Mellitus," *Wien. med. Blätter*, Nos. 6-9, 1883, a résumé of the published cases of this affection is given to date.



ology of this affection in 12 cases, states that in cases where the quantity of glucose is too small to show unequivocal reaction to the copper-and-potash test the presence of these spores is sufficient to establish a diagnosis of saccharine urine.

Simple balanitis and balano-posthitis sometimes assume a very severe form, particularly in uncleanly persons and in those who have been intemperately treated by caustic applications. The penis, particularly at the glans, becomes very much swollen, very red, and perhaps the seat of ulceration. In some cases the whole penis is involved. In this stage the affection may be mistaken for cancer. I once saw a case of this kind for which amputation of the penis had been proposed by a surgeon, and which was promptly cured by cleanliness, soothing lotions, followed by mildly stimulating applications. In this condition of balano-posthitis we do not see the nodulations and large, warty growths so frequently seen in epithelioma of the penis, and, besides, the organ is not deformed, as it usually is in malignant disease. Then, again, while in balano-posthitis there may be more or less painful swelling of the lymphatic ganglia of the groin, these structures in epithelioma are enlarged, hardened, and aphlegmasic. As a rule, severe balano-posthitis is seen in young men and the malignant disease in older ones.

### **Balanitis in Syphilitic Subjects.**

In the early stage of syphilis, coincidently with the erythematous or papular rash, balanitis is not uncommon in persons having long and tight foreskins, particularly if they are careless in the matter of cleanliness. With the erythematous syphilide one or more round or oval deep-red excoriations are developed, which, with the aid of uncleanness, may invade the whole glans and prepuce. Mild and ephemeral in its course as this specific balanitis is in cleanly subjects, it may, owing to inattention, be followed by ulceration and diffuse thickening of the parts.

Syphilitic papules upon the glans, and less commonly the prepuce, also owing to uncleanness, very often develop into red, excruciated patches which may involve both surfaces in inflammation. It is not very infrequent to see in early syphilis red patches and papules, both of which go on to cause balanitis, which are developed without coexistent dermal rashes.

These forms of balanitis in syphilitic subjects, unless properly cared for, are very persistent, and are often followed by indurated œdema of the parts, and also, later on, by well-marked sclerosis and phimosis. In some cases the subpreputial papules become much hypertrophied, and in others they are followed by the growth of simple vegetations.

A diffuse inflammation of a subacute character and infiltration into more or less of the surface of the glans and prepuce are sometimes seen as the expression of the initial manifestation of syphilis. This so-called "infecting balano-posthitis" is soon followed by the enlargement of the inguinal ganglia, which, together with its subacute course, tends to point out its specific nature.

### **Chronic Balanitis.**

In contradistinction to the foregoing acute forms of balanitis there are the chronic forms. In general, chronic balanitis is seen in persons beyond

thirty years of age. It generally begins upon the glans and prepuce, which are usually in close coaptation, owing to some abnormality. The inflammation is usually of a subacute character, and shows decided exacerbations and remissions. In this way the affection extends over years. If retraction of the prepuce is more or less possible, a somewhat reddened, thickened, and perhaps slightly excoriated surface is revealed. Owing to the thickness and lessened elasticity of the prepuce, it rolls back, if at all, with difficulty, and in many instances this procedure is wholly prevented by the development of a fibroid ring at the preputial orifice. Such patients say that they have constant inconvenience with their penis, have much difficulty in cleansing the foreskin and glans, and have recurrences of tolerably mild inflammation. When examined from time to time a decided thickening of the epithelium is seen, together with considerable increase in the submucous connective tissue. The parts then have a bluish-white, milky-looking surface, which rarely becomes frankly red, owing to the fact that the blood-vessels have been narrowed by the general condensation of the mucous membrane. To the touch such a glans and foreskin feel firm, somewhat like wash-leather, and as time goes on turgescence of the end of the penis is never complete. Unless in such a case circumcision is performed, the growth of the epithelial covering of the glans increases and much diminishes its size, and very frequently it so compresses it that it levels the corona until it is continuous in line with the fossa.

Not only are these cases distressing in the discomfort and suffering incident to the progress of the affection, but they are also attended with much gravity, since as years increase there is a decided tendency for them to undergo malignant degeneration. Upon this thickened epithelial covering excoriations form, which are often very difficult to heal and should always be regarded in a serious light. Beginning thus as one or more excoriated patches, unless art intervenes very soon an elevation is seen which constantly increases, and later on shows signs of malignancy. This is one of the most common modes of development of cancer of the penis.

**Symptoms.**—The symptoms of balanitis and balano-posthitis may be simply a slight itching or burning sensation, or a feeling of severe pain attended by much heat may be present. There is often increased venereal desire. The end of the penis becomes very tender, even to a condition of *erethism*; erections are painful, coitus frequently impossible, and urination attended with a burning sensation. A thin, milky, or a creamy purulent discharge is constant.

**Causes.**—In most cases balanitis is due to uncleanness, and results from the decomposition of the epithelial matter which is formed in the crypts seated in the mucous layer of the prepuce. Excess in coitus, coitus with a woman with a small vulvar orifice or with one suffering from leucorrhœa, and masturbation are frequent causes. The existence of vegetations under the prepuce is a frequent cause of balanitis, and the lodgement of gonorrhœal pus in that position also causes it. In some cases the gonorrhœal discharge excites inflammation at the preputial orifice, which extends to the prepuce and glans. Chancroidal pus and the secretions of primary and secondary syphilitic lesions, and these lesions themselves, are also prolific causes of balanitis.

Micro-organisms play an important part in the development of balano-

posthitis, as has been shown in the descriptive part of this chapter. Much study, however, is yet necessary to place this subject on a clear and scientific basis.

**Complications.**—While balanitis may result from phimosis, the latter may be produced by balanitis. Paraphimosis may also result from inflammation of the prepuce and glans.

Lymphangitis of a mild or severe type is not at all infrequent in severe balano-posthitis, and is quite common when that affection is complicated with chancreoids and various syphilitic lesions, also with gonorrhœa and vegetations. In mild cases the lymphatic vessels feel like cords under the foreskin. In severe cases the whole penis becomes of a deep red, greatly swollen, œdematous, and the seat of severe pain—a condition incorrectly called “penitis.” In these cases phlegmonous abscesses may form under the skin. Following lymphangitis of balanitic origin, inflammation of the inguinal ganglia, and even suppurating buboes, may result.

Not infrequently, particularly in uncleanly persons, diabetics, also in those debilitated by disease or excesses, gangrene of the prepuce occurs from balanitis. Owing to the inflammation of the parts and swelling of the glans, a black spot forms about the middle of the prepuce, and through the button-hole-like opening which results the glans protrudes. (See Fig. 131.)

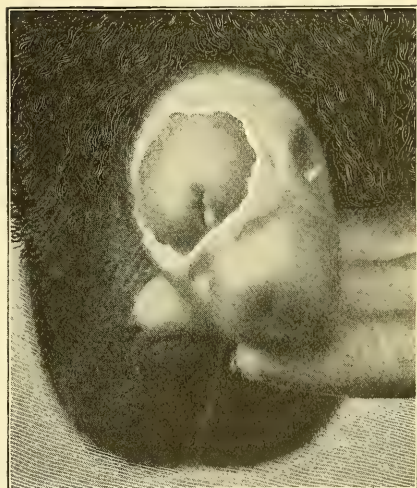
In cases of recurrent attacks of acute balanitis thickening of the submucous connective tissue is not at all uncommon, and may at times present points of resemblance to syphilitic or infecting balano-posthitis. In some cases of acute balanitis well-defined, freely movable, flat plates of thickened submucous tissue of various sizes and extent, which can be readily grasped between the thumb and forefinger, may be felt. I have frequently seen these plates of such firm structure and so sharply limited that they have been mistaken by my internes for hard chancres. Not

uncommonly, after an attack of acute balano-posthitis, a semicircular ring of this thickened submucous tissue is felt for some time behind the corona, and it causes retraction to be less promptly performed than it is normally.

In a phimotic prepuce, besides the thickening of the tissues, a fibroid ring is formed around its orifice in consequence of recurrent inflammation, and in it numerous troublesome radiating fissures may form.

Phimosis and paraphimosis as a result of balanitis have already been spoken of. By far the most serious complication and sequela of chronic balanitis in middle-aged and old persons is the tendency to hyperplasia of the epidermis of the glans and prepuce, which is so prone to lead to epitheliomatous degeneration. Adhesions of various sizes and possessing

FIG. 131.



Gangrene of prepuce, with button-hole opening for glans.



varying degrees of firmness are not infrequent in cases of phimosis complicated with balano-posthitis.

Vegetations as results of balanitis will be considered later.

**Diagnosis.**—In mild cases the diagnosis of balanitis is readily made upon retraction of the prepuce. However, when there is difficulty of retraction the case may be mistaken for gonorrhœa. If the orifice of the prepuce is large enough to allow inspection of the meatus, the parts can be carefully wiped, and then, when pressure is made upon the under surface of the urethra, if gonorrhœa is present pus will exude from the meatus. If it is suspected that both balanitis and gonorrhœa are present, the meatus may be carefully plugged with a little ball of cotton, and then the prepuce may be compressed from behind forward. In this way a correct conclusion may be reached. If the urethra is found to be free from inflammation, pressure over the whole surface of the glans from behind forward will cause pus to escape from the preputial orifice. Besides these points of diagnosis the subjective symptoms will also be of assistance. The presence of gonococci in the pus will show that gonorrhœa is present. In ordinary balanitis or balano-posthitis pus, strepto-, and staphylococci and the smegma bacillus may be seen.

Herpes progenitalis, especially when, from any cause, accompanied with much hyperæmia, may be at first mistaken for balanitis, but the history of the case may be of aid, and upon subsidence of the inflammation the sharply-limited margins of the vesicles will reveal the nature of the affection.

The most difficult task, very often, in the diagnosis of balanitis is to determine whether or not chancroids or hard chancres lodged under the prepuce are at the bottom of the trouble. Chancroidal ulcers may have been seen before the phimotic balanitis had developed, and then its origin is clear. But in many cases, from carelessness or ignorance, patients can give no history of a chancre or chancroid. Subpreputial chancroids are attended with much more severe and rapid inflammation than simple balano-posthitis. The pus becomes very copious, less thick and creamy than in the simple affection, and commonly of a rusty color. Soon the distal end of the penis becomes swollen, in shape like an Indian club, and of a dusky-red color, and very frequently chancroids are developed by auto-inoculation around the preputial orifice. Then in chancroidal phimosis there is the early supervention of lymphangitis and of adenitis, both of which show a tendency to rapid destruction of the tissues. It should be borne in mind that in broken-down, starved, dissipated, and neglectful persons simple balano-posthitis may frequently become of such severity that the features of chancroidal phimosis are present.

Subpreputial hard chancres producing phimosis may be mistaken for simple balanitis. This complication, as a rule, is much less active in its nature than chancroidal phimosis. The affection increases slowly, usually with much less secretion of pus, it being at first very often a sero-pus. The œdema increases slowly, is more aphlegmasic or less red, but rather firmer. The diagnosis is usually soon cleared up by the development of the indurated ganglia in the groin, and perhaps by the induration of the lymphatics and veins of the penis. In very many cases it is possible, upon careful palpation, to determine the presence of a well-defined induration under the prepuce. It must be remembered that subpreputial

vegetations also grow slowly, produce phimotic balano-posthitis, and feel like hard chancres under the prepuce. The secretion accompanying them is profuse and of a disgusting odor, the inflammatory reaction is rather late in appearing, and the lymphangitis and adenitis are less common and of a more inflammatory nature than in the phimotic balanitis of hard chancre.

It is sometimes a difficult question to decide whether in a given case phimotic balanitis is caused by chancroids or vegetations, and sometimes it can be done only after incision of the prepuce.

**Prognosis.**—In general, the prognosis of balanitis is good. When due to chancroids, besides the destruction of the prepuce and glans—and perhaps of the urethra—which is so liable to occur unless proper treatment is instituted, chancroidal ulceration in the lymphatics and chancroidal buboes may result. Hemorrhage also is very common and often very persistent, and phagedena may be produced. Balanitis from hard chancres may result in more or less destruction of the prepuce and glans, compression and stenosis of the urethra, and phagedena.

Balanitis and balano-posthitis caused by early syphilitic lesions are easily cured if early recognized and properly cared for.

The balano-posthitis of elderly persons, with its epithelial hyperplasia, is the source of great annoyance from the discomfort produced and the hindrance to proper cleanliness, and is of positive danger in the tendency which it induces to epitheliomatous degeneration of the prepuce, glans, and penis.

**Treatment.**—Mild cases of balanitis are readily relieved by the retraction of the prepuce, cleanliness, and the interposition of lint or absorbent cotton soaked in plain boiled or distilled water. But various lotions also may be used. When there is much excoriation a one-grain-to-the-ounce-of-water solution of nitrate of silver is often very efficacious, or two grains of alum to the ounce of water may be used. Solutions of lead are particularly useful when there is much inflammation; thus:

Ry. Liq. plumbi subacetat.,	ʒss-ʒj ;
Aquæ,	ʒiv.—M.

To this may be added either one drachm of laudanum or two drachms of wine of opium.

In like manner the following prescriptions may be of much service:

Ry. Acid. boracic,	āā. ʒss ;
Acid. tannici,	ʒiv.—M.
Aquæ,	

Ry. Liq. sodæ chlorinatæ,	ʒij ;
Aquæ,	ʒvj.—M.

Ry. Zinci sulphat.,	gr. vj ;
Spts. lavandulæ comp.,	
Vin. opii,	āā. ʒij ;
Aquæ,	ʒiv.—M.

R̄. Resorcin, ʒj ;  
 Aquæ, ʒiv.—M.

R̄. Zinci acet., gr. viij ;  
 Listerine, ʒiij ;  
 Aquæ, ad ʒiv.—M.

Chichester<sup>1</sup> speaks highly of the following combination :

R̄. Atropiæ sulph., gr. j ;  
 Zinci sulph., gr. ij ;  
 Acidi borici, gr. vj ;  
 Aquæ destil., ʒj.—M.

Sig.—Apply three or four times a day with a brush.

It is assumed that the local physiological action of the atropine is to suspend the function of the mucous membrane and its glands (*sic*), and thus jugulate the secretions. The preparation is certainly very soothing, and in ordinarily mild cases efficacious. Lint or cotton should be interposed between the surfaces.

In some very rebellious chronic and relapsing cases I have seen striking results follow the use of a solution of chloride of zinc, beginning with half a grain and going up to two grains to the ounce of water.

In obstinate cases of diphtheritic balanoposthitis Kaufmann<sup>2</sup> says that he obtained the best results from the application of strong tincture of iodine, either painted on the parts or applied on cotton. In all cases of these affections the first aim should be to put and keep the parts in as nearly an aseptic condition as possible.

The aromatic wine of the Pharmacopœia is a pleasant and efficacious application, used by means of lint or absorbent cotton. Lime-water is also a pleasant application.

Balanitis resulting from early syphilitic lesions is much benefited by the use of black wash or yellow wash, which is also beneficial in many cases of simple balanitis.

A solution of bichloride of mercury (1 : 2000 of water) is often very efficacious. When excoriations are present, after superficial pencilling with a solution of nitrate of silver (ten grains to the ounce of water) the surface may be dusted with iodoform, and then a little film of perfumed absorbent cotton placed over it. Boracic acid, calomel, and subnitrate of bismuth may also be used, particularly toward the decline of the affection. Aristol may also be tried.

Salves should not be used, and poultices should be strictly prohibited, since they do no good and cause œdema.

Copious and frequent ablutions of the parts should be practised several times a day, and when there is any tendency to phimosis frequent injections of hot water slightly alkalized by borax, or a mild solution of alum, or dilute lead-water, or a solution of bichloride of mercury (1 : 2000 to 5000) or of carbolic acid (1 : 200), should frequently be made as directed in the Treatment of Phimosis.

<sup>1</sup> *Medical Record*, March 21, 1891, p. 356.

<sup>2</sup> *Verletzungen und Krankheiten der Männlichen Harnröhre und Penis*, Stuttgart, 1886, p. 232.



The penis should be kept from hanging down by appropriate bandaging, and, as far as possible, the recumbent position should be assumed. In these cases the jock-strap (see page 249) will often be of great service.

When phimosis, congenital or acquired, exists, circumcision should be advised. The treatment of balanitis complicated by chancroids, hard chancres, and vegetations is given under the appropriate heads.

## CHAPTER XXXIV.

### PHIMOSIS.

PHIMOSIS is that condition of the prepuce which prevents its retraction and the exposure of the glans. It may be congenital or acquired.

The morbid structural conditions giving rise to congenital phimosis are—first, the narrowing, sometimes entire occlusion, of the preputial orifice; second, a straitness and narrowness of the prepuce itself; and third, shortness of the frænum. To these may be added, in the acquired form, redundancy of the prepuce. The orifice of the prepuce may be as small as a pin's head, when it may offer an impediment to urination

FIG. 132.

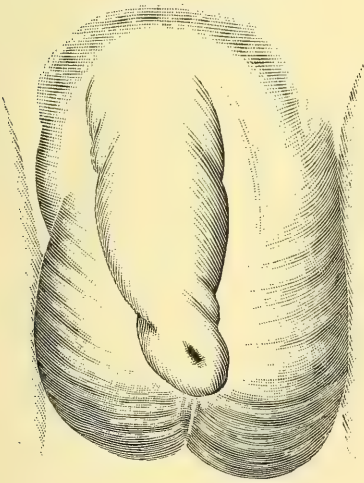
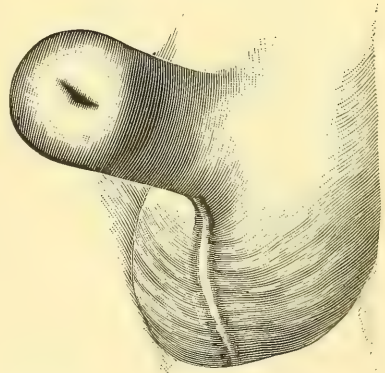


FIG. 133.



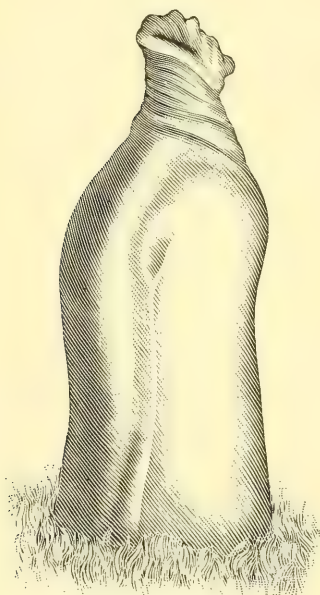
Congenital phimosis in the infant.

and prevent inspection of the meatus, and as large as the diameter of a pea. Not infrequently boys who have not suffered from phimosis in their youth do so later on, owing to the growth of the glans penis and to the concomitant imperfect development of the prepuce.

In most cases of congenital phimosis there are adhesions between the mucous membrane and the glans. These may be thin, small, but numerous and easily broken up, or they may be extensive and firm, even to the complete adherence of the whole prepuce and the glans. In Figs. 132 and 133 are well portrayed the appearances of congenital phimosis in the infant. In this case there was constant erethism of the parts, and the slightest handling of the penis caused it to become erect at once. The preputial orifice was so small that it prevented the free escape of urine and caused the distal portion of the prepuce to become ballooned out. This ballooning of the phimotic prepuce is not uncommonly seen in later life. In such cases children soon become masturbators. A case is reported in which the prepuce was attached to the margin of the meatus and formed a tubular prolongation of the urethra nearly an inch long. Redness, heat, and perhaps superficial ulceration often result from contact of the urine and want of cleanliness. These conditions in their turn may lead to cicatricial stenosis of the orifice.

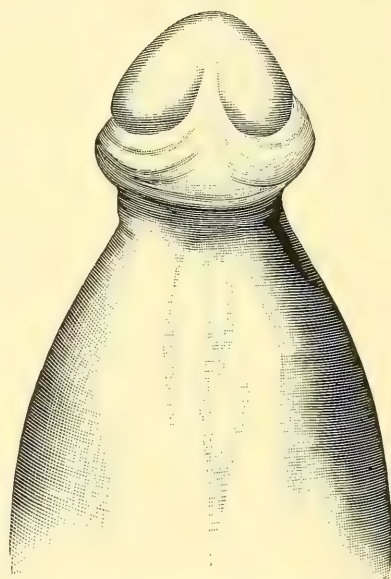
In Figs. 134 and 135 are shown the appearances of the penis of a

FIG. 134.



Congenital phimosis.

FIG. 135.



Congenital phimosis, showing great development of the penis with lack of development of the glans.

young man who suffered from phimosis from infancy. In this case the prepuce was long and tight, while the body of the penis was large. The slightest touch caused erection, as shown in Fig. 135, in which the glans appears remarkably small for such a penis, and it is firmly constricted behind the glans by the tight preputial orifice. This patient suffered all the discomforts just mentioned.

Congenital phimosis gives rise to balanitis, heat, itching, even pain, in the head of the penis, and a consequent erethism of the genitals, with

frequent erections, symptoms pointing to stone in the bladder, lascivious dreams, seminal emissions, and incontinence of urine, especially at night. Such subjects are often addicted to masturbation. As they grow older there is in many an arrest of development of the penis, and sometimes of the testes. When puberty is reached any or all of the foregoing symptoms may exist, and such subjects often complain of too speedy ejaculations and a not full and complete enjoyment of sexual intercourse. At and beyond puberty phimosis, in most cases seconded by masturbation, may give rise to congestion and inflammation of the membranous and prostatic portions of the urethra.

In early life, as remote effects of phimosis, it has been conclusively shown that nervous disturbances, incoordination of the muscles of locomotion and of speech, hyperæsthesia, amblyopia, and hypochondriasis have been produced.

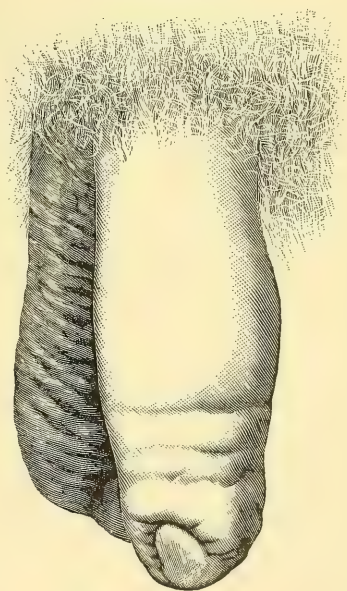
It must be remembered, however, that there are many cases of phimosis which are not attended by any of the foregoing symptoms, direct or remote. At puberty and later, however, phimosis always gives rise to unpleasant symptoms of varying degrees of severity, such as balanitis, balano-posthitis, interference with erections and the sexual act. At this period, particularly, it is a prolific cause of masturbation and of a morbid desire for coitus.

While in general phimosis may give rise to balanitis, the latter affection may give rise to phimosis. This feature was observed in the case from which Fig. 136 was taken. The patient had a long prepuce, with a not very tight orifice, which would admit of fairly easy retraction. He was subject, however, to relapsing attacks of balano-posthitis of some severity, in which the prepuce became inflamed and oedematous, as shown in the figure. In this case the peculiar pouting chin of phimosis is well shown, jutting up and filling in the preputial orifice. This appearance is due to severe oedema of the prepuce near the frænum.

At puberty the irritation caused by phimosis often results in the development of vegetations or warts, and in later life, as a consequence of it, cancer of the penis is liable to occur. In tropical countries elephantiasis of the penis frequently begins in a phimotic prepuce.

There is a condition of the penis in which patients suffer much discomfort until relieved by operation. It is admirably shown in Figs. 137 and 138. This condition consists in smallness of the preputial orifice, smallness as to calibre, and shortness of the prepuce, together with a short fibrous frænum. In these cases all the unpleasant symptoms of phimosis are present, and a chronic rebellious balano-posthitis is an

FIG. 136.

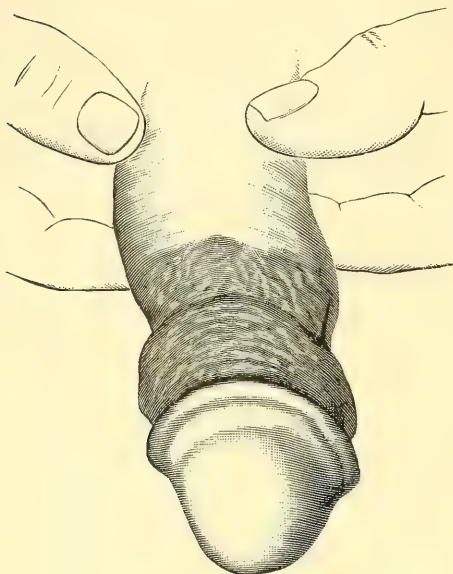


Phimosis from balano-posthitis with the pouting chin.



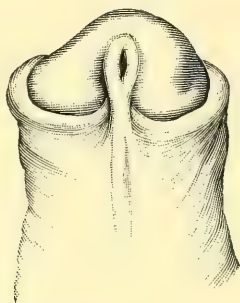
important factor. Usually, in such cases, the glans remains stunted and small in circumference and length, as is well shown in the figure.

FIG. 137.



In China and in tropical countries it is not uncommon to find a calculus, or several of them, under the prepuce in cases of phimosis. These calculi may be small, but they are sometimes very large, and weigh one or more ounces. In shape they are round or oval,

FIG. 138.



Smallness of preputial orifice, with fibroid frænum.

convex and concave, and when there are several in apposition they are faceted.

In some cases of congenital phimosis plates and masses of smegma form under the prepuce, which is bulged out by them. Sometimes these smegma-masses are so firm in structure that they are mistaken for calculi. They may remain in an indolent condition for years, and may give rise to no symptoms.

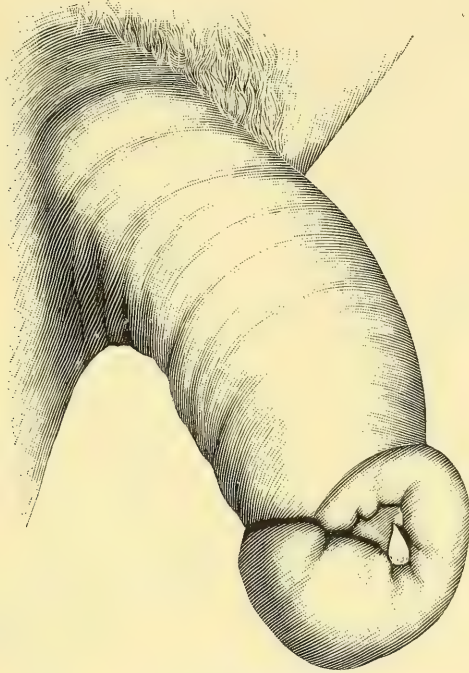
The morbid process in phimosis of all forms may be simply inflammatory œdema, or this condition plus simple or specific cell-infiltration.

Acquired or accidental phimosis may exist in a prepuce normally rather small, but capable of thorough retraction, or in one which in the normal state passes readily backward and forward over the glans. The causes of it are want of cleanliness, the decomposition of diabetic urine, excessive venery, perhaps increased by the abuse of stimulants, gonorrhœa, herpes preputialis, eczema, chancroids, and hard chancres. Traumatism and compression of tightly-fitting pantaloons are also causes. The symptoms vary in severity and in the nature of their concomitants according to the cause.

Phimosis resulting from uncleanness and excessive venery presents nothing characteristic. The prepuce is red and inflamed, and there is more or less balanitis. It is usually an ephemeral trouble and readily amenable to local remedies. Phimosis complicating gonorrhœa is often a troublesome concomitant, since it interferes so much with the treatment of that affection. There is commonly much redness and swelling, and it often produces curious deformities of the organ, as shown in Fig.

139, in which the prepuce is much swollen. In some cases the penis is curved upward, in others downward, and sometimes laterally. Sometimes the intensity of the inflammation is seated in the prepuce near the frænum, which becomes swollen and turned inward, giving the appearance of a pouting chin. (See Fig. 136.) Then, again, the whole extent

FIG. 139.



Gonorrhœal phimosis.

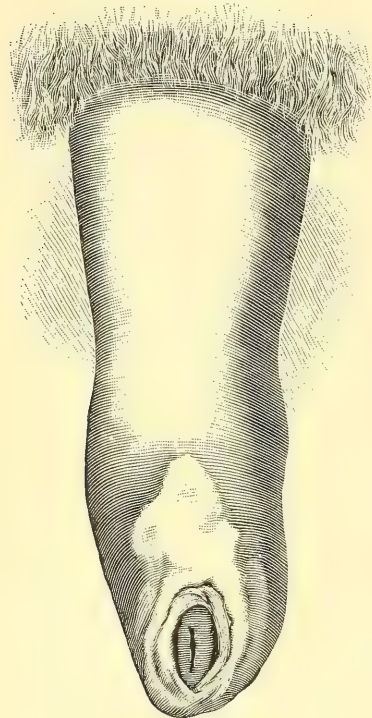
of the foreskin may be involved, in which case the distal end of the penis becomes greatly swollen and comes to resemble a miniature Indian club. In all of these cases there is a purulent urethral discharge. Phimosis caused by herpes progenitalis consists of redness and œdema of the distal end of the penis, together with vesicles.

Gangrene is a rather uncommon complication of the simple forms of inflammatory phimosis, excepting when due to traumatism and diabetes; it is not rare in the severer forms.

Cicatricial phimosis belongs to the category of the acquired affections. Cicatrices frequently follow fissures and ulceration which have been produced by forcible retraction. A fibroid preputial ring is not uncommonly seen in cases of phimotic prepuce. Chronic balanoposthitis also, in some cases of long and somewhat phimotic prepuce, causes a condition of cicatrization of its outer preputial layer which much intensifies the phimosis. This condition of cicatrization of the prepuce is shown in the irregular white area of the distal portion of the prepuce in Fig. 140. Such is the stenosis of the preputial orifice in these cases that circumcision alone will relieve them of their discomfort and suffer-

ing. Recurrent herpes preputialis may cause stenosis of the orifice, either from scars or infiltration. It is somewhat remarkable that in some cases of phimosis, where retraction has been impossible throughout life, little if any suffering has been produced. In Fig. 141 is shown a

FIG. 140.

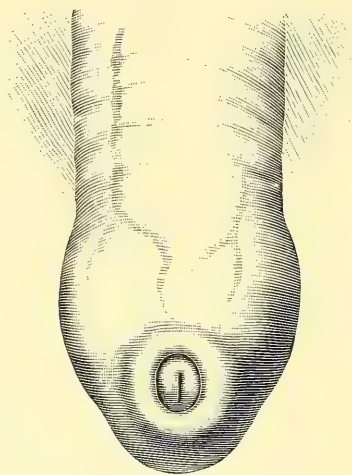


Cicatricial phimosis.

phimotic prepuce with a firm fibrous ring at the orifice, the development of twenty-five years. In this case there was no suffering or discomfort, and the development of the fibroid tissue was so aphlegmasiac that it was not appreciable to the patient.

From puberty to old age recurrent balanitis, even in persons having

FIG. 141.



Fibroid ring at preputial orifice.

roomy foreskins and of cleanly habits, sometimes leads to increase and induration of the subpreputial connective tissue, and converts that appendage into a rather resistant, inextensible cylinder which is with difficulty retracted. In some cases the subpreputial connective tissue is converted into flat, firm plates of tissue, which prevent retraction and favor inflammation.

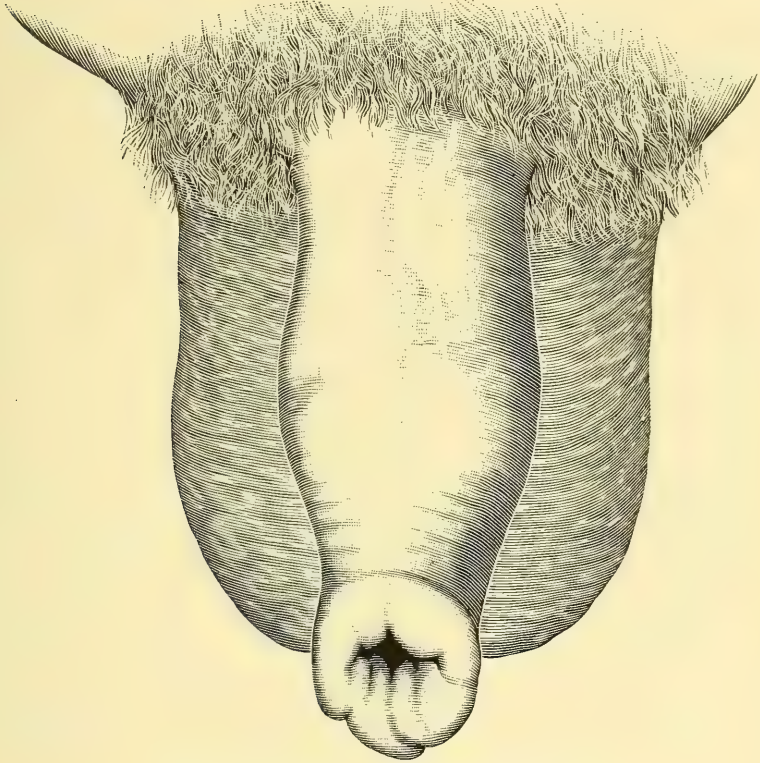
In elderly men, as they advance in age and obesity, the integument of the penis often becomes redundant and lax. As time goes on the prepuce becomes much elongated and extends well down beyond the end of the glans. The organ then, in many cases, becomes a source of discomfort. The inner layer of the prepuce becomes hyperæmic and the urine and smegma readily decompose and cause irritation, with burning sensations. This phimosis of elderly men with a tendency to obesity is well shown in Fig. 142.

The initial lesion of syphilis, when seated on the inner leaf of the prepuce at the frænum and in the sulcus, very frequently in the lower classes produces phimosis, caused usually by want of care and uncleanness. The distal portion of the penis becomes much swollen, and in



typical cases the inflammation is of a low grade. Then we find the organ at the preputial portion of a deep bluish-red, not hot nor painful. In some cases the induration may be made out by palpation, but usually as the phimosis develops the sclerotic mass or nodule is so masked by the

FIG. 142.



Phimosis from obesity and laxity of the integument.

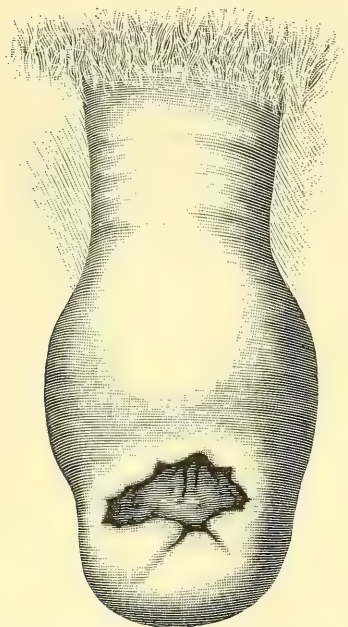
surrounding œdema that it cannot be recognized. Usually the condition remains rather aphlegmasic. The indurated tissues continue to have the bluish-red color, without heat or pain, and the condition is further complicated with typical enlargement of the inguinal ganglia. In some cases pus, and in others sero-pus, escapes from the preputial orifice.

In other cases, however, the initial lesion under the prepuce in phimosis becomes inflamed, and then the condition resembles chancroidal phimosis. In many of these cases chancroids form at the free end of the prepuce, and a mistake in diagnosis is then very liable to be made. In such cases the history and the condition of the inguinal ganglia may afford aid in the recognition of the real condition of affairs. Chronic indurating œdema complicating chancres and secondary lesions may cause phimosis.

Chancroidal phimosis is usually due to want of care of subpreputial

lesions, and frequently to a too active cauterization of them. The prepuce then becomes very red, swollen, and often quite painful, and from its orifice a dark-green or rusty-colored pus escapes in considerable quantity. The penis then becomes so much swollen at the glandular

FIG. 143.

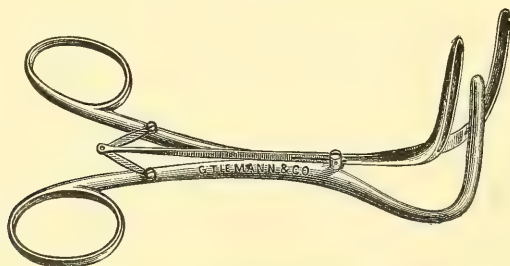


Chancroidal phimosis with Indian-club-shaped penis and destruction of the distal part of the prepuce.

portion that it resembles a miniature Indian club. If relief is not given by operation or the chancroidal process stayed by intra-preputial antiseptic injections, the whole prepuce continues to become larger and more dusky red, the suffering of the patient greater, and the discharge is then very copious and of very bad odor. Then, not unfrequently destruction of the tissues at the preputial orifice occurs, as shown in Fig. 143. If relief is not afforded, the inner leaf of the prepuce or the glans penis is more or less destroyed. In some cases ulceration occurs through the prepuce, and through the hole thus formed the glans then protrudes. In these severe cases nearly the whole penis becomes of a dusky-red color, and the appearances presented are those of a very actively destructive subpreputial inflammation. This condition is in striking contrast with the cold, rather unprogressive, course of phimosis from hard chancres. In many cases of chancroidal phimosis there is a complicating chancroidal bubo in the groin.

**Treatment.**—Some benefit may be derived in congenital phimosis by the gradual expansion of the preputial orifice by means of Nélaton's forceps or dilator. (See Fig. 144.) Care must be exercised that rup-

FIG. 144.



Nélaton's phimosis forceps.

ture of the tissues is not produced, and that the operation is not performed at short intervals: in any case circumcision is far preferable. Slitting up the prepuce on the dorsum, in whole or in part, should only

very exceptionally be done, since good results do not commonly follow. Very little more trouble is involved in the operation for circumcision, and the cure then is perfect. Dr. Bumstead's suggestion, that it would be well for the future comfort of their boys if fathers would inquire into the condition of the penis while they are young, should be widely heeded. Indeed, such attention to hygiene is very often urgently called for in infantile life. In children having long foreskins, when an operation is impracticable, the utmost attention should be paid to cleanliness, particularly in removing sebaceous matter and in preventing lodgement of the urine. Acute inflammatory phimosis is not uncommon in children, and should be treated by copious intra-preputial injections of very warm water, followed by a mild solution of carbolic acid or of boracic acid or of lead-water.

In inflammatory phimosis the recumbent position should be insisted upon, and a light diet and a brisk cathartic ordered. Copious intra-preputial injections of hot water, followed by a 1 per cent. solution of carbolic acid, should be made every two or three hours. If the preputial orifice is too small to admit the nozzle of a syringe, it may be enlarged by the careful use of Nélaton's forceps or by means of a sponge tent.

Injections may be made by various syringes: the one invented by me is of especial benefit. (See Fig. 145.) The nozzle, which is made of

FIG. 145.



Author's syringe for subpreputial injections.

India-rubber, is about two inches long and flat, and on its rounded end are several holes, and it may, if desired, be used with a fountain syringe or irrigator. An ordinary small glass nozzle may often be of very great service.

Whatever fluid is used, it is necessary to see that it reaches all of the intra-preputial cavity, especially behind the glans.

While the patient remains recumbent it is well to keep the penis elevated and enveloped in old linen or absorbent cotton, saturated either with ice-water, a solution of muriate of ammonia, or a lead-and-opium or carbolic wash. The cold-water coil may be necessary in very severe cases.

Leeches should never be used to the penis, since they may produce lymphangitis or septic dermatitis. In very bad cases they may be of benefit if a sufficient number are applied to the groins.

As soon as retraction of the prepuce is possible lint or old linen or absorbent cotton soaked in lead-and-opium wash must be placed between it and the glans, and treatment followed as given in the section on Balanitis.

Phimosis from gonorrhœa needs active and continuous treatment, in addition to that of the acute stage of the discharge. Intra-preputial injections, very hot, frequently made, and large in quantity, of 1 part



of the bichloride of mercury to from 10,000 to 30,000 of water, or of a saturated solution of boracic acid, or of a 1 per cent. solution of carbolic acid in water, should be employed. The penis should be kept in an elevated position; care must be taken to catch and remove the discharge, and lead-and-opium wash, ice-water, or the cold-water coil used in the acute stage.

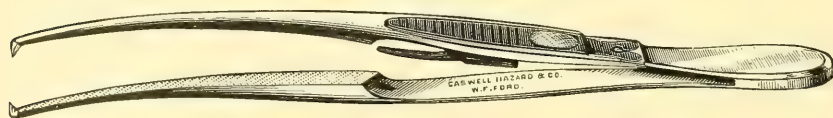
Circumcision should be performed as soon as possible in cases of chronic phimosis, cicatricial phimosis, and phimosis complicated by intra-preputial vegetations.

In performing the operation of circumcision it is necessary to remember that the prepuce is composed of two layers, separated by a cellular tissue of such lax texture as to admit of an almost indefinite amount of motion between them. The internal or mucous layer is firmly attached to the penis posterior to the corona glandis, and hence is incapable of being drawn forward to any great extent in front of the glans. The external or integumental layer, on the contrary, is continuous with the flaccid skin of the body of the penis, and may be greatly elongated.

Previous to the operation of circumcision the penis should be carefully examined by the surgeon with a view of acquainting himself with the conformation of the parts and of determining the amount of tissue to be taken away. If retraction of the prepuce is possible, it is important to study the size, shape, and relations of the frænum and the calibre of the cutaneous sheath at the part where it encircles the glans. Then it is necessary to closely inspect the raphé, in order to see whether it runs directly in the median line, or whether it deviates, as it sometimes does, to one side or the other toward the end of the prepuce.

*The operation of circumcision* which I prefer for its simplicity and excellence of result will now be described: The hair from the genitals and the adjacent parts of the thighs should be shaved off, and the patient thoroughly washed with soap and water and ether and alcohol, followed by copious ablutions of a solution of corrosive sublimate, 1 : 2000. It is always necessary to see that the coronal sulcus has been thoroughly cleansed. The patient then being on the operating-table, the prepuce is drawn well forward, and the clamp or forceps (Fig. 146) is applied,

FIG. 146.

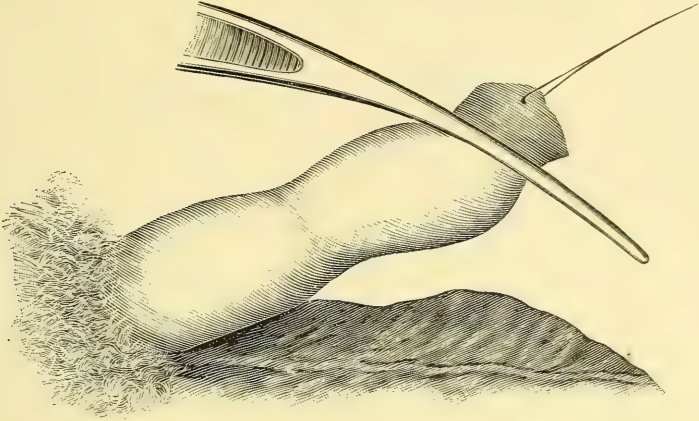


Author's circumcision forceps or clamp.

not in a vertical direction at right angles with the long axis of the penis, but in an oblique position, following the line of obliquity of the glans. When the clamp is on (see Fig. 147), it is necessary to examine the skin of the penis to see that too much of the tissues will not be taken away, and that the organ in erection will not be interfered with or drawn backward. When the clamp is adjusted, cocaine anæsthesia may be produced by the following simple procedure: A syringe being filled with 8 per cent. muriate-of-cocaine solution, its needle, an inch and

a half long, is introduced between the two layers of the prepuce on one side longitudinally, in conformity with the blades of the forceps. When the needle has traversed the whole of one side of the included prepuce, a few drops of the cocaine solution are injected, and as the needle is

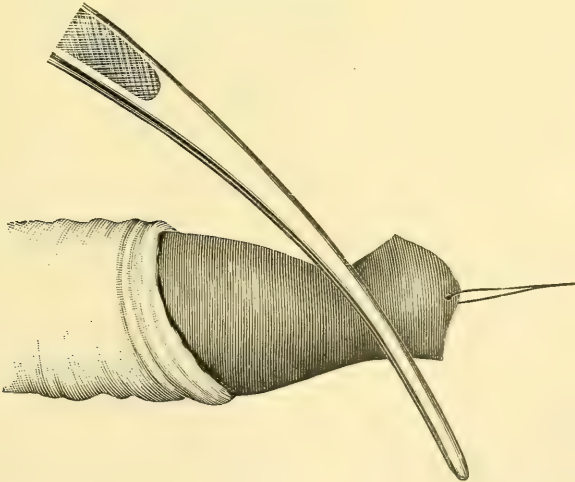
FIG. 147.



Circumcision: forceps on the tegumentary layer of the prepuce.

slowly withdrawn the fluid is left in its track. Then the same procedure is followed on the other side of the prepuce. The parts are then left alone for a few minutes, in order that anæsthesia may be produced. After the lapse of about five minutes the blades of the forceps are

FIG. 148.

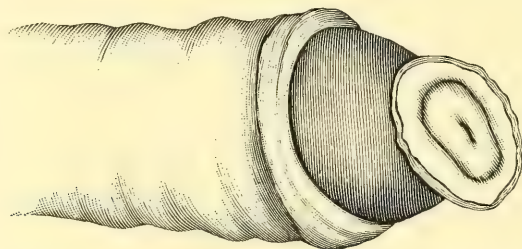


Circumcision, showing the forceps on the mucous layer of the prepuce.

slightly separated, and thus kept for a few minutes, in which time the immediate tissue behind the forceps blades will become anæsthetized. Then the clamp is again put on firmly. By this procedure we avoid

the unpleasant, even dangerous, symptoms of cocaine intoxication and poisoning. Traction on the distal end of the prepuce by a ligature or bulldog forceps is now made, and a sharp, thin bistoury is introduced through the middle of the prepuce, the flat of the blade resting on the clamp. A cut outward is then made, and a second inward cut removes the cutaneous layer of the prepuce. Some cocaine solution is now poured over the bleeding surface. The surgeon then retracts the mucous layer of the prepuce, and ascertains its length and the condition of the frænum. The parts having become anæsthetized, a ligature is run through the mucous layer, and traction is made by it, and the forceps is applied in the same oblique manner to this part. (See Fig. 148.) The second incision is then made in precisely the same manner as the first was. It is generally necessary to crowd the glans backward somewhat, but the surgeon should always make allowance that one-third or one-half of an inch of the mucous layer of the prepuce shall be left, and that as much of the frænum shall be spared. When too much of the mucous layer is taken away, and when the frænum is nearly, if not all, ablated, a bad result is always obtained, and the patient may experience much discomfort for the rest of his life. The incised mucous and cutaneous layers are then coapted, and before the stitches are put in the surgeon should study the conformation of the parts with a view to future symmetry. (See Fig. 149.) In general, the raphé and the frænum are in distinct

Fig. 149.



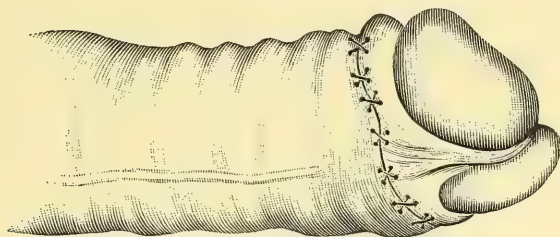
Showing the proper condition of the prepuce after the two incisions.

anatomical continuation, and then the surgeon in his stitching simply follows these natural landmarks. If, however, there is a deviation of the raphé from the middle line, this must be considered, and the line of union so placed that a natural arrangement of the parts will be produced after healing. There is usually more or less hemorrhage, but this very rarely gives any trouble. When the edges are properly coapted the stitches of fine silk, or preferably catgut, should be put in at a distance of a sixth of an inch from the margin of the wound, well through the whole thickness of the skin and mucous membrane. These stitches or sutures should be placed about one-sixth or one-eighth of an inch apart, so that no connective tissue will be exposed between the cut edges. (See Fig. 150.) By these quite numerous sutures all bleeding is prevented and prompt healing is produced. Whenever the stitches are placed far apart the raw submucous connective tissue pushes up between the two cut surfaces, and the process of healing is materially prolonged. The parts are then dusted with iodoform or aristol, and well and sufficiently



firmly bandaged with lint or absorbent gauze. This first dressing may, owing to oozing, have to be removed on the third or fourth day, and then replaced by a similar one. If the dressing looks clean and the patient is comfortable (there being no itching, smarting, or uneasiness in the penis), the first dressing may remain on several days. When thorough antiseptics is practised, perfect union may result in six or seven

FIG. 150.



Shows the penis after adjustment of the stitches.

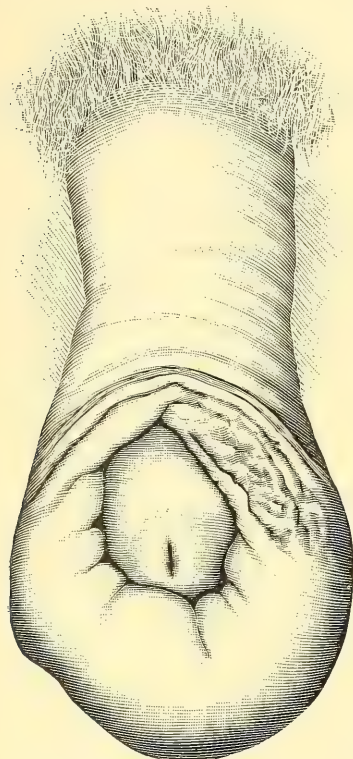
days, particularly if the patient can lay up and if medication to prevent erections has been administered. Erections sometimes materially delay union. The stitches may then be removed, and a dressing applied for a few days. Usually two or three dressings are sufficient. After the operation the parts may be more or less sensitive for a time, but they gradually adapt themselves to their altered condition.

In some cases of urgency it may be necessary to perform circumcision, and the proper instruments may not be at hand. In this event the following simple, but not to be commended, operation may be performed: The parts being properly cleansed and shaved, the prepuce is drawn forward (if retractable) over the glans; then, by means of a pair of scissors with long blades, an incision is made in the middle line on the dorsum of the penis. The prepuce then appears like two dog's ears, which must be cut off with the scissors, following the line of obliquity of the glans. In this operation it is necessary to be careful that the two incisions of the dog's ears are symmetrical, that too much tissue is not taken away, and that the frænum is left intact. The parts are then stitched together, the same care being taken as has already been pointed out. The dressing is the same as that of the first operation.

In the treatment of chancroidal phimosis, and of the phimosis which sometimes complicates hard chancres, the great bugbear in the past has been the fear of infecting the incised surfaces. This fear has led to delay, to the use of inefficient methods of treatment, and in many cases to the destruction of large portions of the penis. Such a fear is entirely groundless, since the truth is, that when properly treated by incision these cases begin to improve at once, and in the end come out well. The rule, therefore, in these cases should be that when such tentative measures as hot antiseptic injections and immersions in hot borax and carbolic water have failed, and it is evident that the subpreputial lesions are inaccessible to treatment, even before evidences of perforation of the prepuce are to be seen, the parts should be thoroughly incised, so that they may be inspected at will and properly treated.

The old operation for these conditions was the dorsal incision, which in almost every case fails to give the expected relief. This dorsal incision, even if sufficiently long, in most instances only gives access to the most prominent portion of the glans penis, while the fossæ of the frænum and the coronal sulcus are inaccessible or become so in a day or two after the operation. When the dorsal incision is made in most cases the condition of affairs portrayed from life in Fig. 151 confronts the surgeon. It will be seen that the glans is encircled by the lower or franal portion of the prepuce as by a pillow, and that the sulcus is inaccessible. Now, these are the parts on which chancroids are most commonly found, and after this operation the surgeon has a large incised wound to treat, and can only with difficulty get at the most morbid of the parts. Therefore, I say that in these cases the dorsal incision is a most dismal form of delusion. More than twenty years<sup>1</sup> ago I called attention to this surgical failure, and proposed a different method of operating, which in the hundreds of cases which have come under my care in the mean time has always proved satisfactory and successful. This operation is simplicity itself, and consists of two lateral incisions of the inflamed prepuce. Prior to the operation, which should, if possible, be done under ether, the preputial sac or cavity should be thoroughly irrigated with Thiersch's solution, carbolic solution (2 per cent.), or sublimate solution (1:2000); the hairy

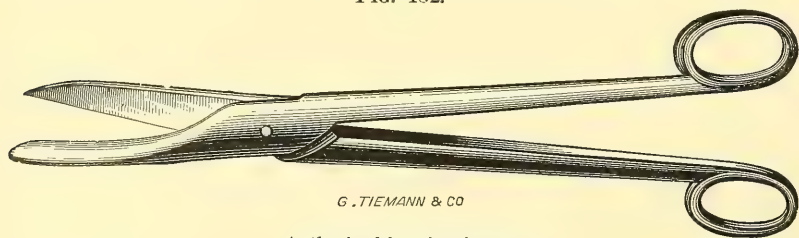
FIG. 151.



Chancroidal phimosis, showing the results of the dorsal incision.

or cavity should be thoroughly irrigated with Thiersch's solution, carbolic solution (2 per cent.), or sublimate solution (1:2000); the hairy

FIG. 152.



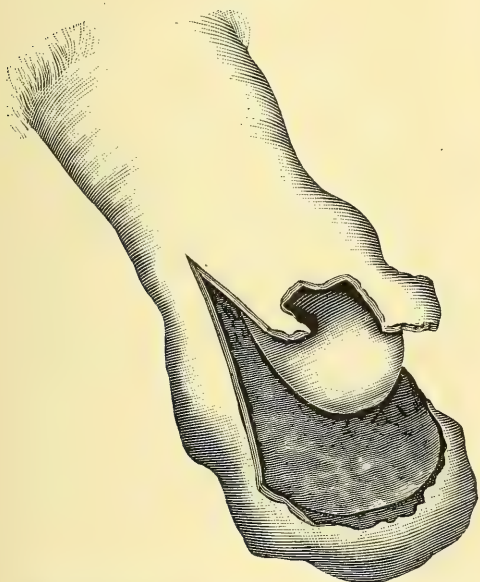
Author's phimosis scissors.

parts may be shaved and the genital region rendered as nearly aseptic as possible. It is necessary to remember that in this form of phimosis

<sup>1</sup> "On Some Practical Points in the Treatment of the Phimosis produced by Chancroidal Ulcers," *Am. Journ. Syphil. and Dermat.*, Oct., 1872.

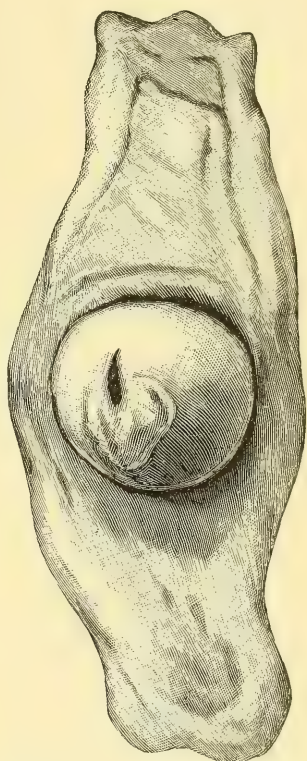
—namely, chancreoid and in that due to hard chancre—the prepuce becomes very much elongated by reason of the inflammatory œdema, and that in most cases the glans becomes retracted, probably pushed back, by the closeness of investment of the thickened and inflamed prepuce. The penis being held in the line of the thighs by an assistant, the patient being on his back, the surgeon introduces the lower or flat blade of my phimosis scissors (see Fig. 152) (which resemble the plaster-of-Paris scissors) well back to the bottom of the coronal sulcus on one side, exactly on the median line. The scissors must be held firmly, and some force may be necessary in bringing the blades together, for the tissues are usually very hard and brawny and show a tendency to resist and slip from the blades; so

FIG. 153.



Chancreoid phimosis, showing position and depth of lateral incision.

FIG. 154.



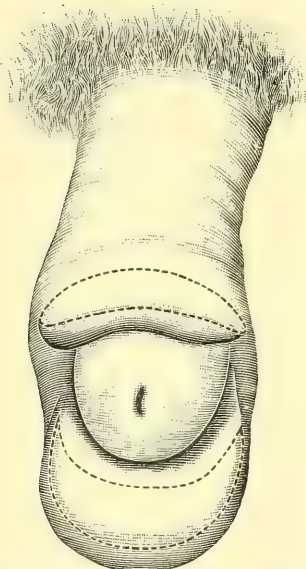
Chancreoid phimosis, showing the long flaps held back and the complete exposure of the inner surface of the prepuce and the whole of the glans penis.

that if the incision is not sufficiently deep to render the coronal sulcus visible and accessible, it must be lengthened. This being done, the same care as to symmetry and to being on the median lateral line is observed in the incision on the other side. (See Fig. 153, which was taken from life immediately after the operation.) The phimotic condition in this case is shown in Fig. 143. The surgeon then has full access to the whole of the glans, the sulcus, frænal fossæ, and the inner layer of the prepuce. This is shown in Fig. 154, in which the glans is seen to somewhat resemble a bone-stump, and the prepuce the two flaps, in a case of amputation in the continuity of a limb. It is usually not well to apply the antiseptic dressing until the bleeding is stopped.



After thorough antiseptic irrigation absorbent gauze in several layers may be carefully placed between the inner layer of the prepuce and the glans, and the prepuce then may be put in position and a roller bandage of gauze applied around the whole organ. This dressing may be removed in about twelve hours, when the parts should be irrigated, and then dusted with iodoform or aristol, and gauze placed between the glans and flaps, and a gauze bandage applied around the distal part of the penis as firmly as can be borne. Usually the dressing should be renewed daily after very copious irrigation. The ulcerated lesions will begin to improve at once. If gangrene or phagedena has been present, either of these processes will be promptly arrested, and the raw surfaces will give no trouble. The period of reparation and healing varies in different cases, but in general fully a month, and even longer, elapses before cicatrization is perfect. When the parts have healed the flaps will be found to be remarkably short considering their previous length. The top one may be simply a small truncated cone,

FIG. 155.



Chancroidal phimosis, showing healed parts after lateral incision. Dotted lines indicate the shape of the incision necessary to complete the circumcision.

which can be readily cut off by a straight incision, or if it is thickened the parts may be cut out by two elliptical incisions, as shown in Fig. 155, which should be continued down fully half an inch or deeper, in order to remove redundant inflammatory tissue. In the same way the under flap must be treated by incisions in elliptical or curved lines, carried well down to remove the redundant tissue. It may be stated, as a rule in these cases, that a wedge-shaped mass must be removed from the lower flap, and this incision should be in keeping with the conformation of the parts. The edges of the flap-wounds are then brought together with four silk stitches and the parts antiseptically dressed. Usually healing is prompt, and in the end a very good result is obtained. This lateral-flap operation is really one of circumcision in two stages. When there has been much destruction of the prepuce and glans, the symmetry of the parts is correspondingly impaired. It is wonderful, however, to see in some cases where there has been much loss of tissue how lavish Nature is in her process of repair.

It may be well to warn young practitioners never to perform full circumcision in cases of chancroidal phimosis. I have seen some youngsters have a very unhappy time after they had had the hardihood to resort to this extreme measure.

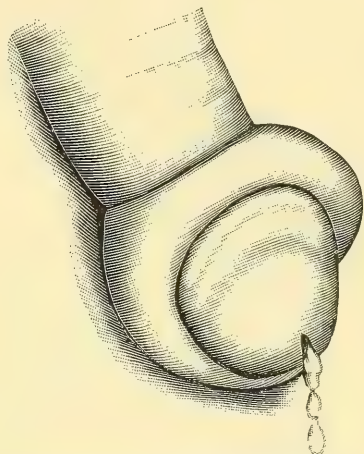
## CHAPTER XXXV.

## PARAPHIMOSIS.

PARAPHIMOSIS is that condition of the penis in which the prepuce, retracted behind the corona, cannot be pushed forward over the glans.

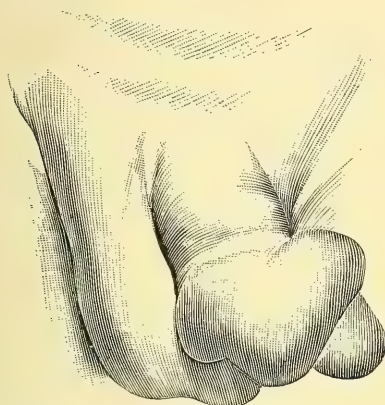
It is found in young boys who, perhaps from curiosity and with some force, have retracted the prepuce for the first time. It also occurs in young subjects as a result of masturbation. In these cases the young

FIG. 157.



Partial mild paraphimosis from gonorrhœa.

FIG. 156.



Paraphimosis in a young boy.

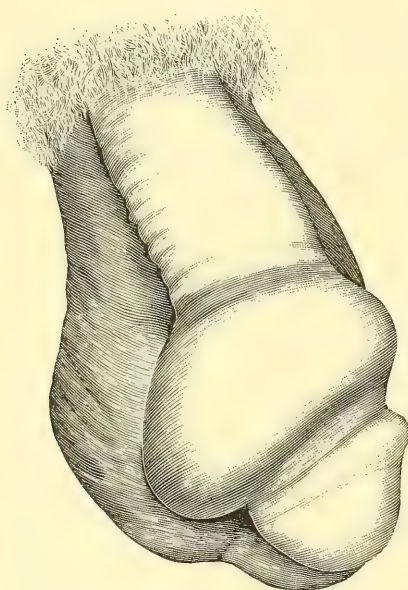
boy usually complains of pain quite early, and reduction is commonly not attended with difficulty. (See Fig. 156.)

Paraphimosis occurs in older persons who have a long foreskin and narrow preputial orifice; in those who have a long, straight, and more or less tight foreskin; in patients who have a short frænum; in those who have short and rather tight foreskins habitually worn over, and only partially covering, the glans; in those having short, not abundant, foreskins worn behind the glans; and, finally, in those whose foreskin is in perfect proportion to the glans.

The causes of paraphimosis are, primarily, the more or less developed malformations; secondly, inflammation causing constriction, balanitis, balano-posthitis, excessive coitus, perhaps increased by alcoholic excess; coitus with a woman having a small vulvar orifice; traumatism, gonorrhœa, eczema, lymphangitis: the retraction of a phimotic prepuce the seat of intra-preputial vegetations; chancroids and hard chancres. It is seen in all grades of mildness, in which it is reducible, and in all stages of severity, in which reduction is more or less difficult, and even impossible without operation or incision. A partial paraphimosis of mild character is sometimes met with as a result of gonorrhœa, particularly in persons who have a not long, but rather roomy, prepuce. This is well shown in Fig. 158. With ordinary care this condition subsides with the decline of the gonorrhœa.

The mechanism of paraphimosis is very simple. Retraction of the tight preputial orifice behind the glans leaves a fold or ring of mucous membrane just behind and continuous with it, and which ceases at a more or less deep furrow, and beyond this furrow is a swollen ring or fold of integument. The ring of mucous membrane is the inner surface of the prepuce; the furrow is formed by the orifice of the prepuce, at the bottom of which it acts as a constricting ring, while the cutaneous fold or ring beyond is the external layer of the prepuce. In this condition inflammation begins and increases. The glans becomes swollen and red, even purplish, in color; the mucous collar of the penis becomes red, œdematous, and puffed out like a bladder; the constricting preputial ring strangulates the parts more and more as they become swollen; and

FIG. 158.



Acute reducible paraphimosis with profuse serous effusion.

the cutaneous ring or collar beyond it also becomes more red and œdematous. In such a case, if relief is not obtained, the condition of affairs becomes worse. Besides the engorged glans, the chief swelling is seated under and just behind it on each side of the frænum. When seen quite early this chin-like protrusion of mucous membrane is found to be filled with serous effusion. (See Fig. 158.) As time goes on, this is replaced by fibrinous and cellular exudation, and this chin-like body becomes hard and resisting. (See Fig. 159.) Coincidentally with this the strangulation of the glans is greater; the mucous-membrane pad behind it is more red, swollen, and infiltrated; the constricting ring is correspondingly smaller; the cutaneous ring of prepuce behind it more swollen. In this state the penis often becomes

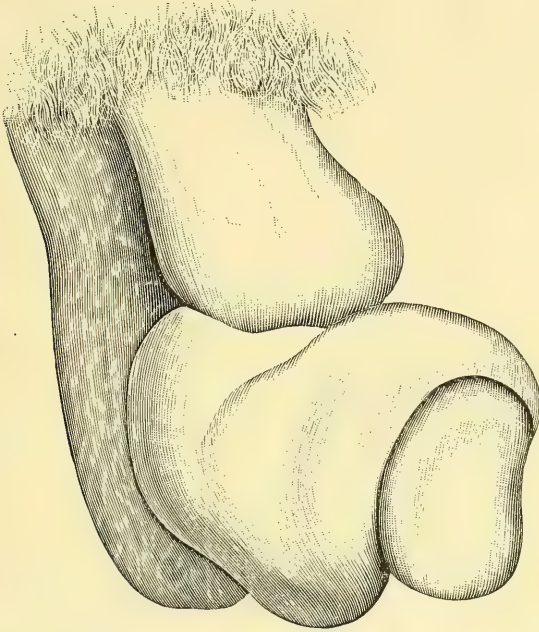
twisted in spiral and other peculiar forms, curved nearly at a right angle, and sometimes distended to the point of strangulation (Fig. 160). In conditions thus seemingly desperate the parts may thus remain, and become permanently fixed by cell-exudation. (See Fig. 163.) Generally, however, nature intervenes, if art is withheld, and the constricting ring is attacked by ulceration or gangrene; in which case a longitudinal fissure forms along the dorsum in the mucous layer of the prepuce, and a corresponding one in the cutaneous portion. These increase, fuse, involve the preputial ring, and end by forming an ulcer seated transversely to the axis of the penis and behind the glans. Constriction is then ended, the patient's sufferings are relieved, but much œdema and engorgement may remain.

In somewhat exceptional and anomalous cases there are two points of strangulation—the one at the preputial orifice or ring, the other in the mucous membrane at the base of the corona glandis, and largely due to



the excessive engorgement of the part. (See Fig. 161.) Then in other cases the retraction of the prepuce is incomplete, and the orifice or ring

FIG. 159.



Showing paraphimosis in which the parts have become hard and resisting.

only slips back behind, and not much beyond, the corona, where it is firmly held, and is with difficulty reduced except by operation.

FIG. 160.

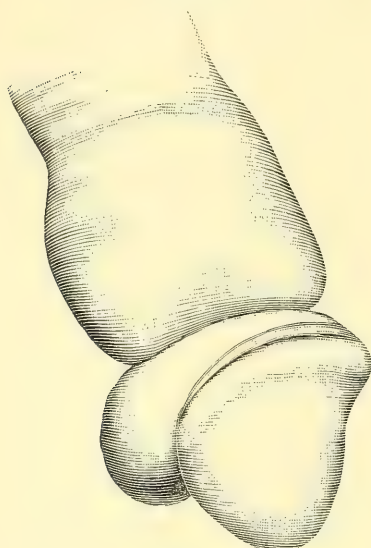


Paraphimosis, penis curved nearly at a right angle.

Gangrene, however, may occur under these circumstances and may result in the destruction of more or less of the integument or glans, may involve the urethra, may perforate a blood-vessel, cause intense suppurative inflammation, and lead to erysipelas, phlebitis, and lymphangitis.

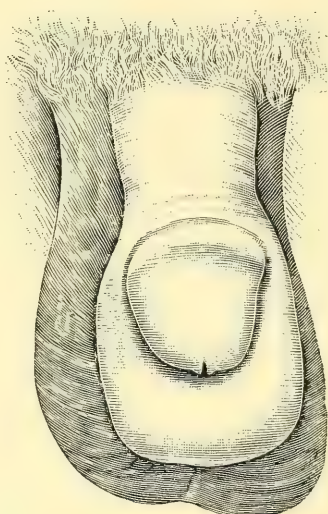
In those cases in which reduction is accomplished early little if any disfigurement is left. When only the phimotic ring has been cut, on the

FIG. 161.



Anomalous form of paraphimosis in which there is strangulation at the preputial ring and at the base of the corona glands.

FIG. 162.



Preputial frill or chin following protracted paraphimosis.

subsequent pushing forward of the prepuce over the glans a median cut on its upper border is seen. When the exigencies of the case have necessitated a long incision through the reflected mucous layer, the preputial orifice, and the tegumentary layer of the prepuce, on the cessation of the inflammation and the reduction of the foreskin it will present the same lateral dog's ears as are seen when the dorsal incision is practised in phimosis. Not infrequently, the treatment having been delayed, the retracted portions of the prepuce on the dorsum of the penis become adherent to the corpora cavernosa, and its under portion forms a prominent chin or subpreputial frill of firm structure, which protrudes from the region of the frænum forward. (See Fig. 162.)

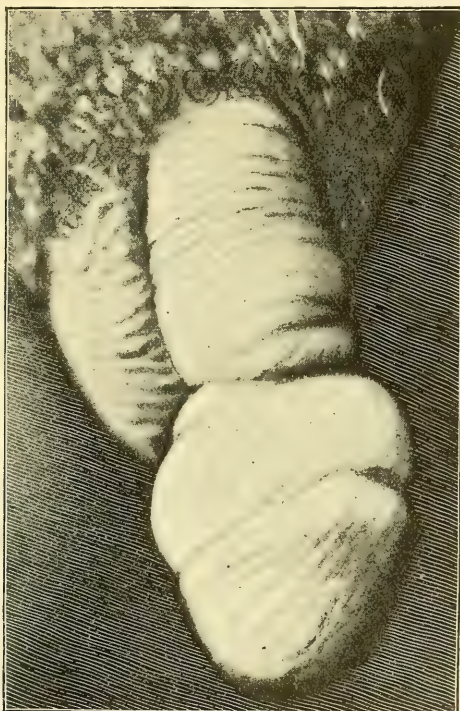
In some cases, owing to ignorance and utter neglect, paraphimosis develops, the preputial ring ulcerates, and no treatment is adopted. In these cases the site of the ring of ulceration becomes a ring of cicatricial tissue more or less firmly adherent to the corpora cavernosa. Then œdematous hyperplasia under the mucous layer and behind the glans and in front of the ring occurs, and a hard, brawny tissue is produced. In these cases usually no amount of incision will permit of the replacement of the prepuce over the glans; a tedious treatment is necessary,

which in the end will not leave the parts in a normal state. This condition is very clearly shown in Fig. 163.

These are the sequelæ in the preputial covering in the simple inflammatory forms of paraphimosis now under consideration.

In the paraphimosis due to the initial lesion the parts are hard and brawny, and the process is of a subacute nature. In the paraphimosis complicating chancroids we have the simple condition plus much ulceration, inflammation, and swelling. In these latter cases, if not treated promptly, there may be destruction of tissue of greater or less extent. There may therefore be resulting deformity in these severe forms of paraphimosis.

FIG. 163.



Chronic paraphimosis with ulceration in the preputial furrow, and condensation of both layers of the prepuce.

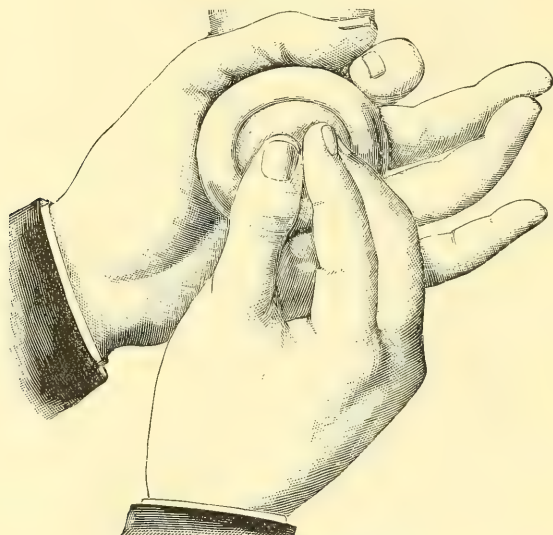
**Prognosis.**—The prognosis in paraphimosis depends entirely upon the stage of the trouble when first seen. If the surgeon is consulted early, reduction can be accomplished without difficulty. If later, when strangulation has taken place, various sequelæ, from the dorsal ulcer or gangrenous spot to more extended gangrene and destruction of the integument and perhaps portions of the glans and urethra, lymphangitis, phlebitis, and erysipelas, may occur. Such structural effects as scars of the prepuce and the beard at the frænum may be removed by subsequent operation.

**Treatment.**—The first procedure necessary in a case of paraphimosis is to thoroughly wash the penis in warm soapsuds, followed by affusion



of a 2 per cent. watery solution of carbolic acid, or a bichloride solution 1 : 1000 or 2000, since a phimotic condition is produced by reduction, and cleanliness will hasten resolution. Immersion in very hot water for fully half an hour is of much benefit when practicable. When there is much pain and in nervous, fidgety subjects a few whiffs of chloroform to induce very slight narcosis, or even the full effects of ether, may be necessary. Sometimes the recumbent position, with elevation of the penis in a cylinder of pasteboard, and a brisk cathartic, followed by a hot sitz-bath, will lessen the œdema and render the surgeon's duty much easier. It is always well to knead the parts and to press out as much as possible of the serum. A little olive oil or vaseline may be smeared in the balano-preputial furrow, but not on the glans, since it then causes the operator's fingers to slip. In those cases in which the mucous membrane of the region of the frænum is translucent and much serum is seen (see Fig. 158)

FIG. 164.



Method of reduction of paraphimosis.

multiple punctures, followed by gentle pressure by the hand around the head of the penis, will always be followed by benefit and the reduction of the parts.

Several methods of reduction may be employed. A simple plan is to make a ring of the fore finger and thumb of the left hand, which firmly encircles the penis behind the constriction; at the same time that this hand is drawn forward, the glans, grasped by the fingers of the right hand, and at the same time compressed and elongated, is pushed backward, and reduction may follow. (See Fig. 164.) Another method is to take the penis behind the constriction between the index and middle fingers of both hands, and, making very firm traction while the thumbs crowd down upon it, knead and press the dorsum and base of the glans backward. (See Fig. 165.) Still another method, occasionally successful, is to strap the glans from apex to base with a half-inch Martin's bandage,

then push the retracted prepuce forward by means of the ring made of the thumb and forefinger, and then, when reduction has been effected, gently extricate the rubber.

Bardinet's<sup>1</sup> method may also be tried. He describes it as follows:

FIG. 165.



Method of reduction of paraphimosis.

"I bend the glans on its anterior (lower) aspect and gently draw the skin of the penis forward from behind the constriction. I then attempt to insert the bend of a hair-pin between the preputial ring and the body of the penis. This done, I have two levers in the branches of the pin, which I move back and forth for a triple purpose—to depress the prominence of the base of the glans, to elevate the preputial ring, and to secure an inclined plane upon which it may gently be made to glide."

Colles's method<sup>2</sup> is to "pass a director beneath the constriction from before backward, and elevate it upon the point of the instrument, while the stem was made to compress the swelling in front and gradually force it

back beneath the stricture. This process was repeated on each side of the penis, after which reduction was quite easy."

Compression of the glans by forceps of any kind usually fails. Should all these efforts fail, operative procedures are necessary.

In many cases incision of the constricting band is sufficient to relieve the parts. Since in most cases this is seated in the furrows already described, a curved bistoury may be introduced on the flat surface on the glandular side of the constriction, well down under and through it, taking care not to wound the corpora cavernosa. If the swelling is such that the curved bistoury cannot be introduced beneath the band, a thin straight one may be used. This should be introduced at right angles to the penis at the outer edge of the constriction, and a number of firm but not deep cuts should be made, the operator being slow and deliberate in his movements with the point of the instrument until the band is felt to give way.

In some cases it is necessary to incise the mucous membrane and skin in the line with the incisions already spoken of. When this is done, it is well to inquire as to the natural length of the prepuce, and to make the incisions in conformity with the facts ascertained. Another rule is to take the length of the glans as the guide, and make the incision as long as that. As a result of this procedure the patient subsequently has the so-called dog's-ear prepuce, which requires a further operation to complete the circumcision.

When the constriction exists just behind the glans, it is sometimes with difficulty made out, and much care must be observed to cut it alone.

<sup>1</sup> "Nouveau procédé de Réduction du Paraphimosis," *L'Union méd.*, Paris, 1873, p. 900.

<sup>2</sup> *Dublin Quart. Journ. Med. Sciences*, May, 1857.

Cases of chronic paraphimosis, such as depicted in Fig. 163, require long and patient treatment. The parts should be soaked in hot water two or three times a day, and then the segment behind the glans may be compressed for several hours a day by a rubber bandage. When absorption has gone on to such an extent that movement, even slight, of the prepuce over the corpora cavernosa is possible, it is well to free the cutaneous ring-like end of the prepuce and the mucous end of it, which are at the constricting furrow, either by gentle dissection or by tearing apart with a blunt instrument. Then, when these parts are loosened, a longitudinal incision of nearly or possibly an inch long is made into each of these segments of the prepuce. Then, after one or more attempts, reduction will usually follow and the typical dog's ears will be seen. The case then requires cleanliness, and later on ablation of the lateral portions of the prepuce. The preputial chin or frill may be removed by proper incisions.

In the treatment of paraphimosis due to hard chancres it is first necessary to reduce the hyperæmia by immersions of the organ in very hot water; then the penis may be bandaged quite firmly with lint soaked in black wash. As the process of involution occurs a plaster of mercurial ointment may be bandaged around the penis. This application, together with constitutional treatment, will cause resolution in most cases.

Chancroidal paraphimosis requires as the first essential in treatment frequent irrigations of the penis with hot 2 per cent. carbolic water or 1:2000 hot sublimate water. These irrigations should be long continued and thorough. In addition, the penis should be immersed several times a day in these solutions. Seeing that early reduction of the parts would lead to phimosis, it is well to take especial care that the ulcers are promptly healed. Iodoform, kept in place by gauze or absorbent cotton, may be very effective. As a dressing the bichloride solution (1:2000) also may be very beneficial. But in every case most reliance may be placed on the irrigations and immersions. In all cases, even of simple paraphimosis, where there is tendency to ulceration or gangrene these antiseptic measures should also be adopted. Chancroidal paraphimosis very often leads to deformity of the penis, for which partial ablation of the prepuce or circumcision may be necessary.

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## CHAPTER XXXVI.

### HERPES PROGENITALIS.

HERPES PROGENITALIS, by some incorrectly called "herpes preputialis," is a mildly inflammatory affection, consisting of one or more vesicles or groups of vesicles. It occurs in both sexes, and is perhaps quite as frequent in the female as it is in the male sex. In men it occurs most com-



monly on the inner surface of the prepuce, in the sulcus behind the corona, on each side of the frænum, on the lips of the meatus, on the free margin of the prepuce, upon the integument of the penis, and upon the pubic region. In general, the vesicles are unilaterally placed, though they may be symmetrically developed, or those seated on one half of the organ may encroach on the other half.

In women herpes progenitalis occurs on the inner aspect of the labia majora, on all parts of the labia minora, on the vestibule and prepuce of the clitoris, at the orifice of the urethra, and occasionally on the outer surface of the labia majora and on the mons Veneris. I have seen two cases in which herpes of the whole labium majus was accompanied with herpes zoster of the crural, external cutaneous, and small sciatic nerves of the same side.

As mentioned by Bergh,<sup>1</sup> herpes may develop on the cervix uteri, either alone or in association with similar lesions of the vulva. In women especially, and in men occasionally, herpes is found on the ano-genital region and around the margin of the anus, sometimes synchronously with involvement of the genital parts. In his statistical table Unna<sup>2</sup> records two cases of herpes vaginæ which occurred in the Hamburg general hospital. I have never recognized herpetic vesicles in this region.

The evolution of the affection may occur without any prodromal symptoms whatever: sometimes it is antedated by various neuralgic phenomena, but in most cases there are slight burning, heat, tickling, and itching just before the outbreak. In nervous and chlorotic women an intense pruritus often begins with, and lasts during, the attack. General morbid states seem to have little influence on the evolution of this affection.

The eruption may consist of a single vesicle or it may consist of a group closely packed, or, again, of a number of scattered vesicles, usually following the course of a nerve. The first morbid change observed is a red spot, which is soon the seat of vesicles. These lesions may be of the size of a pin's head or of the diameter of a line, and are rounded, translucent vesicles containing clear serum. When seated on the mucous membranes they, owing to the succulence of the parts and thinness of the epidermis, soon rupture; indeed, it is very rare to see such lesions intact. When seated on the skin, however, they may remain intact for some days, and unless scratched their contents become turbid and they dry into brownish scabs. Herpetic vesicles seated at the margin of the prepuce and on the outer rim of the labia minora, particularly when they are long, may be almost wholly obscured by the inflammatory œdema which the laxity of these tissues sometimes favors. Rupture of the vesicles leaves a shallow exulceration corresponding in size to that of the vesicle. Its floor is at first of a deep rosy-red, with a finely uneven surface, and its edges sharply cut as if punched out, and sometimes undermined, but not, as a rule, to the same extent as in chancreoid. When there is a group of vesicles, they fuse together and rupture, forming a patch which has been described as having a polycyclical outline. This is comparable to the outline presented by two pieces of three-leaf clover placed base to base, which then has a festooned margin formed by segments of circles. Early in their evolution the ves-

<sup>1</sup> "Ueber Herpes Menstrualis," *Monatshefte für Prak. Derm.*, vol. x., 1890, pp. 1 et seq.

<sup>2</sup> "Herpes Progenitalis, especially in Women," *Journ. Cut. and Ven. Diseases*, vol. i. pp. 322 et seq.

icles are surrounded by a well-marked redness, the tendency of which is to gradually decline until a mere hyperæmic rim remains.

Usually the vesicles heal in a few days; in some cases they are very persistent, and in others they become ulcerated and undistinguishable from true chancre. In this state their secretion is sometimes auto-inoculable, and in some cases the cause of buboes. (See section on Chancre.) When seated on an inflamed prepuce and irritated by decomposed smegma or gonorrhœal pus, herpes progenitalis sometimes assumes a more or less destructive tendency. I have very frequently seen vesicles become covered with a thin blackish, very adherent crust, and thus they may remain indolent with no tendency to healing.

When fully developed there is usually an amelioration or subsidence of the itching, heat, or burning, but somewhat exceptionally the excoriated surfaces are exquisitely sensitive, and the patient shrinks from the slightest touch of them. Uncomplicated cases last from a few days to two weeks. Untreated cases, particularly in uncleanly subjects, are sometimes persistent and rebellious to treatment.

Under the name "neuralgic herpes" Mauriac<sup>1</sup> first described an affection of considerable gravity in which, besides the eruption, there is a coexistent neuralgia of various branches of the sacral plexus. He cites the case of a man who for eleven days previously had felt a slight sensation of heat in the prepuce, and was suddenly attacked by a severe pricking and itching in the part. Mere pressure of the clothes became insupportable, and the pain was so intense that sleep was impossible. Four or five days later he was attacked by darting pains down the leg and in the perineum, buttocks, and scrotum. Anæsthesia, alternated with hyperæsthesia, made the patient's sufferings nearly unbearable. Two years later the patient had another attack, only one vesicle being present, during which he suffered from boring pains, neuralgia of the urethra, and disturbances of sensibility. In a second case observed by Mauriac forty-eight hours preceding the appearance of a single vesicle paroxysmal pains radiated through the penis and perineum, and subsequently darted up and down the leg. A short time after a vesicle appeared at the orifice of the meatus, accompanied by hyperæsthesia of the urethræ, painful micturition, and pain in the bladder.

In my experience, herpes progenitalis is not infrequently preceded or accompanied with neuralgia of some part of the male genito-urinary apparatus. I have seen several cases of vesicles seated on either lip of the meatus attended with neuralgia of the bladder and urethra. The canal itself was of a deep-red color, and was bathed with a scanty mucous secretion in which no pus-cells could be detected. The affection usually lasts a week or longer, and is painful during the first few days. I have also seen several cases in which pain on the side of the scrotum corresponding to the situation of the vesicles on the penis, of a burning and exquisitely sensitive character, was experienced during the existence of the herpetic eruption. It sometimes appears as a concomitant of acute and subacute gonorrhœa.

The following well-marked case of neuralgic herpes was for a long time under my care: A man thirty-five years old, thin and pale, but of average good health, whose father and whose sisters had been for years subject to

<sup>1</sup> *Leçons sur l'Herpès névralgique des Organes génitaux*, Paris, 1868.

sciatica and other neuralgias, had since his fifteenth year suffered from sciatica, which during a period of twenty years had returned every three months. The attacks were usually preceded by gastric disturbance. The pain began just above the knee and extended upward to the gluteal region. In a few days he experienced a sensation of heat and burning on the side of the penis corresponding to the sciatica, followed promptly by a group of vesicles which was painful. There was burning in the urethra, strangury, and pain on the same side of the scrotum as the sciatica. In seven out of ten attacks of sciatica herpes progenitalis was present.

This affection is peculiarly prone to relapse, as shown by Doyon,<sup>1</sup> at longer or short intervals, occasionally with distinct periodicity for many years. Sabrazés<sup>2</sup> reports the case of a man twenty-nine years old who for nine years had relapses of herpes of the mouth and penis.

In exceptional cases there are swelling and pain in the inguinal ganglia of the corresponding side. Sometimes, when the vesicles become much inflamed and ulcerated, suppurating buboes occur. I have several times seen this happen in syphilitic subjects, and have been led to think that most authors are too positive in asserting that these glands possess an immunity in herpes progenitalis.

This affection is peculiar to adults as late as middle life, and is rarely, if ever, seen in old persons.

**Etiology.**—Various constitutional conditions—neurotic, gouty, rheumatic, and plethoric—were formerly regarded as the causes of herpes progenitalis, but their influence, if such exists, is simply that of greater or less predisposition. Extended clinical observation has shown that local determining conditions are, as a rule, the existing causes of the affection. These may be briefly stated as any or all congestions and inflammations, ephemeral or long continued, of various grades, affecting one, several, or all portions of the genito-urinary tracts of both sexes. Thus, following balanitis, particularly when resulting from phimosis, gonorrhœa, chancroids, and hard chancres, especially in severe instances, herpes progenitalis frequently appears. In patients subject to strictures—particularly when deep seated—and to lesions at the neck of the bladder herpes has been known to occur, commonly at or following an exacerbation. Following exploratory operations upon the urethra and bladder, particularly when protracted, herpes of the penis has been found to develop. I have seen recurring herpes appear coincidently with renewed inflammation in a man suffering from chronic epididymitis. In like manner, long-continued turgescence of the penis from any cause may be followed by the appearance of the affection.

As causes predisposing to herpes progenitalis in the male, uncleanness and decomposition of the sebaceous matter, excessive venery and over-indulgence in alcoholics, hot weather, obesity, and plethora are frequently noted. The neuropathic condition may act as an underlying predisposing cause.

In women, as in men, congestions and inflammations, ephemeral or long continued, are always the underlying causes of herpes progenitalis. Prostitutes are those who suffer in greatest number from this affection, due, undoubtedly, to the very frequent irritation of their genital apparatus

<sup>1</sup> *De l'Herpès recidivant des Parties génitales*, Paris, 1868.

<sup>2</sup> *Annales de la Polyclinique de Bordeaux*, January, 1890, p. 1888.



in coitus. Many years ago I saw, weekly, large numbers of *puellæ publicæ*, and observed a goodly proportion thus affected. Such is its frequency among these women that Unna calls it the "vocation disease." Violence to the female genitals in rape and from excessive size of the penis, and in masturbation, particularly when large and firm substitutes for the penis are employed, often produces herpes of the parts. Vulvitis, vaginitis, simple or severe, are frequently the forerunners of the affection. Congestion of the pelvic organs, dysmenorrhœa, pelvic cellulitis, metritis, inflammation of the ovaries and tubes, and endometritis are likewise occasional excitants of the affection. It is also, as recently pointed out by Bergh,<sup>1</sup> a frequent forerunner and concomitant affection of menstruation, so that in France the term *bouton de règle* has been applied to it. During this epoch it frequently attacks young girls, young women, and even those of middle age. The attacks may come on every month or there may be intervals of freedom of several months. It is perhaps rather more frequent in sexually-inclined and neurasthenic women, as claimed by Bergh. As in men, so in women, herpes progenitalis is seen in early and late adult life, and found to relapse in the same exasperating manner.

It is probable that in all cases of herpes progenitalis disturbance occurs in the nervous arc which exists between the genital apparatus and the spinal cord, and that irritation is transmitted from the external or deep portions of the genital apparatus backward to the spinal nerve-centres, and from these conveyed to some portion or portions of the penis, vulva, or mons Veneris. Clinically, many cases of herpes progenitalis present features of similarity to herpes zoster, even to the point of being coexistent with it.

Although it has been suspected that herpes progenitalis may be of microbic origin, little is known in support of such an hypothesis. Diday and Doyon<sup>2</sup> state that Zeissl informed them that he had found cocci, but not micrococci, in the serum of an unruptured vesicle. Rohrer<sup>3</sup> found very few diplococci and bacteria, and Pfeiffer<sup>4</sup> in a case of menstrual herpes could find no micro-organism.

**Diagnosis.**—Usually, the diagnosis of herpes of the genitalia is readily made, but when exulcerated the vesicles may closely resemble chancroid or hard chancre. As a rule, the sensations of heat, itching, and burning, the superficial character of the lesion, its less profuse secretion, and scarcely undermined edges will establish the diagnosis, which may be strengthened by the history of relapses. Further, the very frequent unilateral position and peculiar groupings of the herpes vesicles are important diagnostic aids, while in some cases the arrangement of these lesions in the course of a nerve points undoubtedly to their nature.

Both in its solitary and multiform conditions herpes zoster may resemble the syphilitic chancre in its early and erosive stage (chancrous erosion). There are probably more errors made by mistaking this as yet undeveloped initial lesion for herpes than there are about any other form of the hard chancre. The surface of the chancrous erosion is usually of a deeper and duller red color, even copery, and its floor is smooth and shining, without

<sup>1</sup> *Op. cit.*

<sup>2</sup> *Les Herpès génitaux*, Paris, 1886, p. 274.

<sup>3</sup> *Monatshfte für Prak. Dermat.*, vol. vii., 1888, p. 991.

<sup>4</sup> *Ibid.*, vol. vi., 1887, p. 590.

any small granulations. Its areola is very slight and of a dull-red color, and there is a general absence of inflammation about the whole lesion. Leloir<sup>1</sup> emphasizes the statement with much positiveness that pressure between the thumb and forefinger of a chancrous erosion will fail to cause a drop of serum to exude from its surface, while if similarly treated an herpetic vesicle gives issue to repeated drops. This diagnostic point, which Leloir calls the *signe de l'expression du suc*, in my judgment should be interpreted in a contrariwise direction. Very many times, for purposes of getting a good picture of these chancres and in teaching, I have held chancres between my fingers from five to twenty minutes, and even longer, and have almost invariably seen an abundant and constant oozing of serum, so much so that great care against infection was necessarily taken. Handling herpetic vesicles in a similar manner never produced more than a scanty secretion. So that, in my opinion, abundance of secretion is at least presumptive evidence of chancrous erosions.

It is a good rule to be always guarded and reserved in the diagnosis of these minute lesions, particularly in cases in which there is absence of the prodromal and accompanying symptoms of herpes, and especially when the lesion seems particularly insignificant. This point cannot be stated in a too impressive manner. It is these insignificant lesions which usually develop into hard chancres. In like manner, a clear history of antecedent herpes should not embolden the surgeon to speak too confidently of the simple character of its successor. A group of chancrous erosions constitutes what is called the multiple herpetiform chancre, which is liable to be mistaken for a cluster of herpetic vesicles. Besides the points of difference already given concerning a single erosion, in its multi-form condition the diagnostic points insisted upon by Fournier may afford much aid. Patches of chancrous erosions assume a round or oval outline or irregularly round or oval shape. Herpes progenitalis, on the contrary, has the polycyclic form, with its festooned and segments-of-circles-like margins, due to the fusion of a group of round vesicles. Still, I have several times seen the multiple herpetiform chancre present for a few days a typically distinct polycyclic outline.

**Treatment.**—The first indication is to remove irritation or inflammation from the external and internal parts of the male or female genital apparatus. If any abnormality of the prepuce exists as an exciting cause, circumcision should be performed as early as possible after the healing of the lesions, since benefit is produced in the vast majority of cases. Any deep-seated urethral trouble or affection of any of the accessory parts of the genital tract should receive appropriate treatment. All sources of irritation of the penis should be avoided, and frequent ablutions in hot water made. Any coexisting dyscrasia, gouty, rheumatic, neurotic, or plethoric, should receive proper attention. Sexual, alcoholic, and dietary excesses should be interdicted.

In women, as far as possible, irritations, congestions, and inflammations should be avoided or removed by appropriate treatment, and the frequent use of douches of hot water should be insisted upon. The health of the patient should be considered, and any deviation from the normal attended to. Diday and Doyon consider the sulphur waters of Uriage as

<sup>1</sup> *Leçons sur la Syphilis*, Paris, 1886, pp. 99 et seq.

of benefit in this affection. I myself have never seen any permanent benefit derived from natural waters taken internally.

Locally, many agents may be employed. For irritable herpes in either sex the lead-and-opium wash is often very soothing. Very often the persistent neuralgic and burning pains require for their relief very careful but thorough cauterization with carbolic acid, solutions of nitrate of silver (sixty grains to the ounce of water), or perhaps with fuming nitric acid, after which the lead-and-opium wash may be applied. As an adjuvant in these cases frequent immersions in very hot water are very soothing. Boracic acid and iodoform, alone or in combination, are frequently of benefit where a tendency to ulceration exists. Aristol and euphrapha may also be of service. Iodoform and glycerin, or in ointment form mixed with vaseline (one drachm to the ounce), very frequently are beneficial in relieving the neuralgia and promoting healing.

A solution of the bichloride of mercury (1:3000) or of carbolic acid (2 per cent. to the ounce of water) may be found useful. Aromatic wine, pure or diluted one half with water, is a pleasant application.

The following formulas may also be tried:

R <sub>y</sub> . Argenti nitrat.,	gr. ij ;
Ext. bellad.,	gr. x ;
Aquæ,	℥j.—M.
R <sub>y</sub> . Zinci sulphat.,	gr. vj ;
Spts., lavandulæ,	℥ss ;
Glycerinæ,	℥iss ;
Aquæ,	ad ℥j.—M.
R <sub>y</sub> . Alumini sulph.,	gr. xij ;
Acid. carbol.,	gtt. xx ;
Aquæ,	℥iv.—M.
R <sub>y</sub> . Resorcin,	℥j ;
Aquæ,	℥iv.—M.
R <sub>y</sub> . Acid. tannic.,	℥j ;
Aquæ,	℥iv.—M.

Black and yellow washes are sometimes very soothing and healing.

In several cases of the relapsing form of herpes progenitalis, when occurring on the cutaneous investment of the penis, I have seen good and even brilliant results in the abortion of the vesicles and in the relief of the burning and pruritus by a method of treatment advocated by Dr. Dupas<sup>1</sup> of Lille. This consists in the application, by means of compresses, of absolute alcohol or alcohol to which resorcin, 2:100, menthol, 1 gramme to 100; carbolic acid, 25 centigrammes to 100; or of tannin, 2 grammes to 100,—have been added. I have also seen benefit follow compresses of spirits of camphor. In many cases, however, the abortive treatment fails.

All solutions should be carefully applied to the parts on lint or absorbent cotton. Calomel, calcined magnesia, oxide of zinc, subnitrate of bismuth, starch, lycopodium, and Venetian talc may be used during the stage of healing as dusting powders.

<sup>1</sup> *Journal of Cutaneous and Genito-urinary Diseases*, vol. vii., 1889, p. 474.



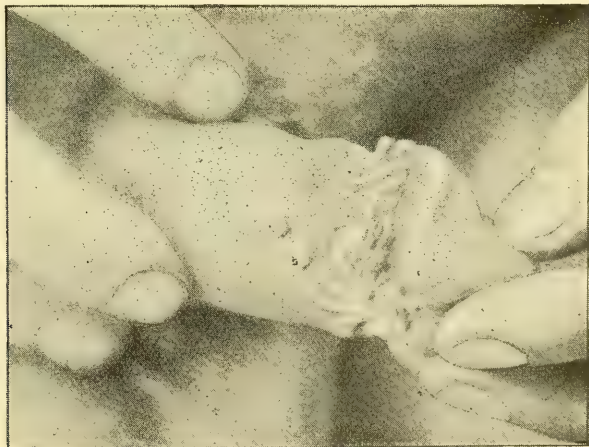
## CHAPTER XXXVII.

## VEGETATIONS.

VEGETATIONS are papillary new growths formed by hypertrophy of the papillæ, increase in the epidermis and capillaries, and hyperplasia of connective tissue. They are known under various names, the chief ones being venereal warts, pointed warts, moist warts, fig warts, cauliflower excrescences, pointed condyloma, *verruca acuminata*, *verruca vegetantes*, *condyloma acuminata*, *spitz condylom*, and *végétation dérmique*. It is important to remember that these names are applied to vegetations alone which are simple new growths, and that the term "*condyloma latum*" is given to certain papillary growths of syphilitic origin.

Vegetations are not, in the majority of cases, of venereal origin, though their most frequent sites of development are on or in the neighborhood of the genitals of both sexes, particularly in persons who have had gonorrhœa, leucorrhœa, chancroids, and syphilis, and in pregnant women. It is incumbent upon the physician to be very careful in the employment of the word "venereal" as applied to warts, for great injustice may be done to patients, male and female, in whom these lesions may be present, but who may not have been guilty of sexual transgression. Their growth is induced and favored on mucous surfaces and at the junction of the skin and mucous membrane, and on thin, delicate skin, by uncleanness, by the decomposition of sweat and of sebaceous matter, and by the presence of gonorrhœal and other kinds of pus. For clearness of description, vegetations may be divided into two well-marked classes: first, the soft, suc-

FIG. 166.

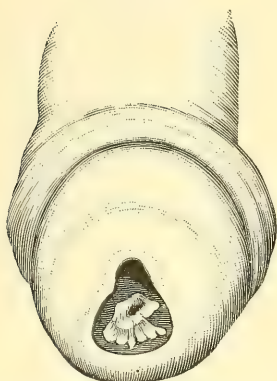


Soft young vegetations in the coronal sulcus and near frænum.

culent warts of the mucous membranes and muco-cutaneous junctions; second, the harder and firmer warts which appear on the skin, particularly near the genitals, since here the two factors essential to their growth—namely, heat and moisture—exist.

The soft warts or vegetations are found in the male upon the corona, in the sulcus behind it, and on the inner surface of the prepuce, particularly near the frænum (very clearly shown in Fig. 166). They also are found around or within the orifice of the meatus, sometimes to the depth of nearly an inch. (See Fig. 167.) In women they commonly develop upon the fourchette, around the entrance of the vagina, and within it as far as the uterus, and upon the inner surface of the labia minora and majora and upon the anal region. (See Fig. 168.) From the genitals in either sex they may spread to neighboring regions.

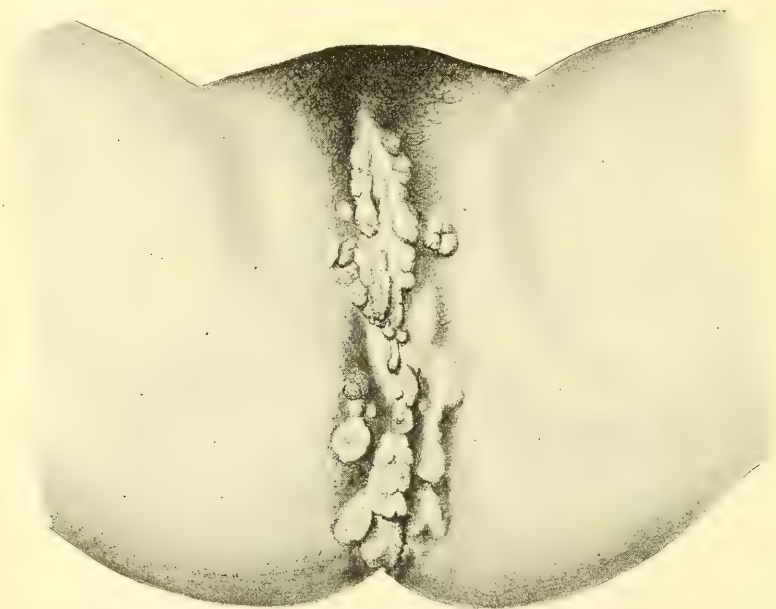
FIG. 167.



Warts within the orifice of the urethra (lip of meatus mechanically separated).

Vegetations begin as minute reddened erosions of the mucous membrane, which very soon come to look like pinhead-sized, rosy-red, finely-granular papules. In this state I have known them to be mistaken for incipient hard chancres. From this insignificant-looking lesion growths even of vast size spring. When the parts are moist and little attention is paid to cleanliness, they grow rapidly and exuberantly, but where the parts are dried they grow slowly and show less tendency to peripheral develop-

FIG. 168.



Vegetations of vulva and anal region, those on the skin hard and horny.

ment. The close coaptation of parts, with their greater inaccessibility to care and their increased secretions, also favors rapid growth. The

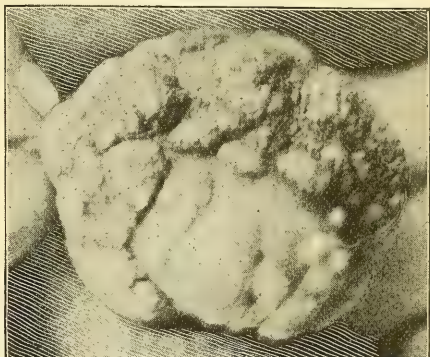
pinhead-sized warts already described grow in height and in breadth and form vegetations of various shapes. They may be rounded and sessile or pedunculated or Indian-club- and mushroom-shaped, in which conditions they vary in size from that of a pea to that of a raspberry. Or, instead of growing in breadth, when from the formation of the parts they are subjected to lateral pressure, they grow to a length of an inch and more, and separated they look like so many thin red spears with smooth sides jutting out and radiating in various directions. This form, looking like the blossoms of thyme, which was called by the older writers *acrothymion*, is seen chiefly around the introitus vaginæ and vulva, and, springing from the balano-preputial furrow in subjects having a roomy prepuce, and from the region of the frænum, has been called the *verruca digitata*, or finger-like or spear-shaped wart. The exuberant development of warts of the sessile and pedunculated or club-shaped forms may result in new growths of enormous size, which are called fungating masses and cauliflower excrescences. (See Fig. 169.)

The color of vegetations varies in different subjects and at different times. They may be of the deep red of the cock's comb or of a purplish red, and when rather

small they may be but slightly more pink than the mucous membrane upon which they are seated; frequently they are of a gray or dirty-gray color. Their surface is covered with minute mammillated warty elevations resembling those of the strawberry or raspberry. A very clear idea may be gained of the appearance of vegetations from inspection of the foregoing figures. On mucous surfaces, particularly when covered, as by the prepuce, or in close coaptation, as in the vulva, vegetations are attended by a sticky mucoid secretion which rapidly undergoes decomposition and gives rise to a penetrating and sickening odor. In the male they are frequently the cause of balanitis when seated upon the prepuce near the frænum or in the sulcus glandis, and when about the meatus a purulent discharge, resembling gonorrhœa, may be produced. Likewise in the female a well-marked purulent vulvitis or vaginitis is sometimes caused by vegetations and often aggravated by uncleanness. On the other hand, they frequently develop around the introitus vaginæ as a result of the irritation of gonorrhœa or leucorrhœa. Vegetations in women are never, as claimed by some, absolutely diagnostic of gonorrhœa.

Various annoying and injurious mechanical conditions are sometimes caused by vegetations in both male and female. Men having the various malformations of the prepuce, such as smallness of the orifice, straitness and tightness and redundancy, and those in whom the frænum is short, upon the development of warts on these parts are very liable to phimosis.

FIG. 169.

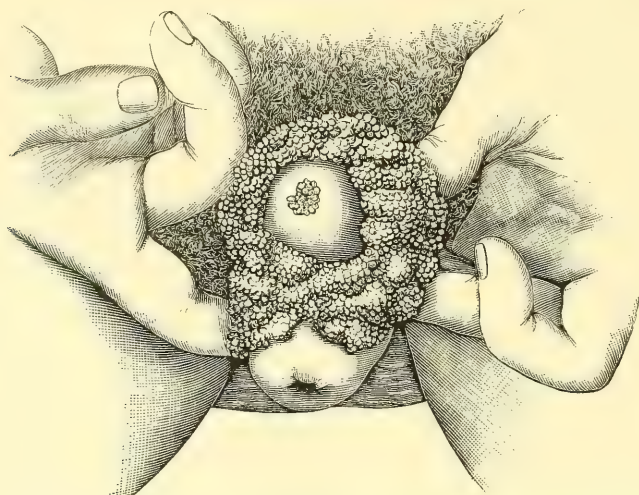


Exuberant warts involving the inner layer of the prepuce, the sulcus, and the greater portion of the glans (cauliflower appearance).



This complicated condition is often accompanied by much inflammatory action and with a copious flow of pus. Warts thus concealed under the prepuce, the conditions being so favorable, grow rapidly, sometimes pushing forward and out of the preputial orifice, and again they press upward,

FIG. 170.

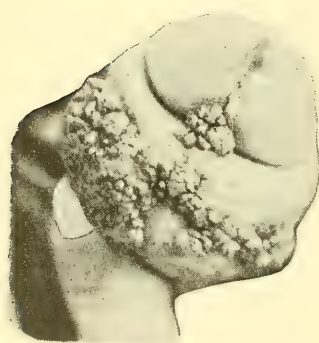


Showing perforation of the prepuce by warts, and their subsequent exuberant development.

causing gangrene and perforation of the prepuce, as shown in Fig. 170, in which it will be seen that the meatus is covered with these growths.

When seated about the frænum they first cause difficulties in retracting the foreskin, and later on phimosis with all of its concomitant uncleanness and suffering. The flow of urine and the ejaculation of semen are often rendered difficult by vegetations around the urethra and at the frænum, and coitus is rendered impossible.

FIG. 171.



Showing hard, corneous warts on the inner lamella of the prepuce and at the frænum, complicating paraphimosis.

Then, again, warts are not infrequently the cause of paraphimosis. In Fig. 171 is well shown a half ring of hard small warts, very characteristic in appearance, seated on the inner surface of the prepuce and at the frænum. These have given rise to much inflammatory hyperplasia. In this state the patient, with some force, retracted the prepuce and produced a rebellious condition of paraphimosis.

In women vegetations at the meatus and in the vestibule very often give rise to irritation, often severe in character, spasmodic pains, burning, and a discharge, and sometimes a frequent desire to pass water, and they may act as an impediment to

urination. In the vulva and around the introitus vaginæ, besides these inflammatory accompaniments, when small they interfere with the introduction of specula and with coitus, and when excessively large, even to the size of an egg or an orange, they impede urination and effectually block up the vaginal orifice. Cure of such cases often involves partial stenosis of the orifice. The lot of women thus afflicted is indeed a sorry one, and those in whom the growth of vegetations has extended around the anus further suffer from irritation, spasmodic contractions, and pain and difficulty of defecation.

The soft, succulent vegetations sometimes, when irritated or subjected to traumatism, become very much inflamed, and even gangrenous, and in the inflamed condition have been regarded as exuberant epitheliomata. Long-continued irritation has been known to transform these growths into true epithelioma in both male and female, particularly after middle age. Indeed, the occurrence of warts about the genitals in elderly subjects, male and female, should never be passed over lightly. Such subjects should be informed of their frequent tendency to malignancy. All such growths should be promptly and thoroughly removed. Epithelioma of the penis and vulva very frequently begins in simple vegetations. As instances I recall the case of a gentleman, aged forty-eight, who had on the inner layer of the prepuce a rough, flat patch of vegetations which had existed several years, and which developed into fungating epithelioma. Further, I preserve a vivid recollection of the case of a lady, aged fifty-three, who had a seemingly insignificant wart just to the right of the clitoris. She refused treatment, the growth increased and became transformed into epithelioma, which caused her death fifteen months after its development. The lesson presented by these cases is obvious.

The hard or corneous warts of the skin may exist alone or follow the successive crops of soft ones which begin on mucous surfaces. They consist of small red, sometimes dirty-brown, sessile, rounded or pointed tumors, quite firm in structure, of an area of a line or more, and of a height of two or more lines. Their features are usually very striking and in marked contrast to condylomata of syphilis. In structure they are similar to the soft ones, except that, owing to the nature of the skin, their epidermal covering is thicker, their papillæ shorter, and the connective tissue more condensed. They occur on the penis, on the scrotum, in the crural folds, and about the anus in the male, and on the labia majora, inner surface of the thighs, on the perineum, and about the anus in women. Like those of the soft variety, they increase in great numbers, though more slowly. On coapted surfaces their epithelial covering may be rubbed off, and they then give issue to a sticky, fetid secretion, which, mixed with sebum and sweat, is sometimes copious. Their further course is influenced by the conditions which surround them. If the parts are the seat of heat and moisture, especially if the patient is uncleanly, they grow and multiply luxuriously; but if they occur on exposed surfaces, and particularly if they are carefully cleansed or dusted with absorbent powders, they may remain quiescent indefinitely. In like manner, the soft warts, when seated on parts which can be kept dry and are either exposed to the air or to the action of absorbent powders, become hard and corneous and permanently lose their softness and succulence. This transformation occurred in the case pictured in Fig. 171. When para-

phimosis was developed the warts became dry and the epithelial coating became hardened.

It is not at all uncommon to see vegetations in syphilitic subjects in the neighborhood of condylomata lata. In chronic cases in uncleanly subjects syphilitic condylomata sometimes undergo papillomatous hypertrophy, by which the specific lesions become transformed to lesions which to the eye look precisely like vegetations. It is important to bear in mind the possibility of this transformation.

Vegetations, especially of the soft kind, are mostly seen in subjects of from twelve years to adult life, and in the male and female in about equal proportions. As age advances they are less frequently observed, and in middle-aged and old persons they are harder, firmer, and sessile, less vascular, and fewer in numbers, most commonly resembling the chronic seed-warts of the hands.

The question of the contagiousness of venereal warts is a very old one, and is to-day in an unsettled condition. There is a popular impression among the laity that warts about the hands, face, and genitals are contagious to their bearers and to others, and seemingly convincing instances of such contagion are frequently given with a wealth of detail. Güntz<sup>1</sup> of Dresden is the chief advocate of the doctrine of this form of contagion. He reported the case of a child who contracted these growths from having used repeatedly the same chamber as its nurse, upon whose genitals at the time innumerable vegetations were seated. He quotes the so-called successful vaccinations of Dr. Kranz<sup>2</sup> in Lindwurm's clinic.

Güntz further quotes the case of Sir Astley Cooper's assistant, who, during the ablation of a large condylomatous growth, was wounded in the vicinity of the finger-nail, and, as a result, there was developed at the point of injury a growth of condylomata acuminata. Güntz himself in six experiments removed vegetations from the genitals and placed them in incisions on the arms, in each instance with a negative result.

The late Prof. Petters<sup>3</sup> was the chief opponent of the doctrine of the contagiousness of venereal warts, and those interested in this question are referred to his exhaustive essay, which contains the details of twelve carefully conducted but negative experiments.

The following facts show clearly the state of opinion on the subject: Hebra disbelieved in the contagiousness of these lesions, and Ricord was of the same mind. Reder considers the contagion probable, while Geigel regarded it as certain. Zeissl admitted their contagiousness, and Neumann, while conceding the possibility, was in doubt. Lebert, on the contrary, gives it as his opinion that these growths are positively not contagious.

Certain it is that we sometimes hear of very plausible cases which seem to carry conviction, but experimental inoculation has resulted either in untrustworthy results or absolute failure.

In women warts about the vulva sometimes lead to great hypertrophy and disfigurement of the parts.

This form of hypertrophy of the vulvo-anal region of women, I believe,

<sup>1</sup> "On the Question of the Contagiousness of Venereal Warts, the so-called Condylomata Acuminata," *Archives of Dermatology*, vol. iii., 1877, pp. 14 et seq.

<sup>2</sup> "Beitrag zur Kenntniss des Schleimhaut papilloms," *Deut. Archiv für klin. Med.*, 1867, B. 11, pp. 79 et seq.

<sup>3</sup> "Zur Frage der Ansteckungsfähigkeit der Vegetationen oder der Spitzen Condylomen," *Vierteljahr. für Derm. und Syphilis*, vol. vii., 1875, pp. 255 et seq.



has not heretofore been mentioned by authors. The initial stage of it consists in the development of simple vegetations on any part of the external genitals. Owing to neglect, want of care and cleanliness, and of surgical intervention these growths become enlarged, and they then usually increase in numbers. As they grow in height and breadth, particularly those on the outer portions of the labia majora (where they are subject to continuous friction), they lose their warty appearance and come to look like nodules, processes, or tabs of skin. They are, as it were, polished off, losing entirely their granular, raspberry-like look, and taking on the appearance of fleshy integument.

Unless ablated, these tumors inevitably lead to great hypertrophy and disfigurement of the parts. They, acting as low-grade inflammatory foci, induce hyperæmia and hyperplasia in the vulva, and in the end lead to its great distortion. I have many times seen this general hypertrophy of the external genitals by warts, and I recall an instance in which these growths, being very large, were ablated, and in their stumps hyperplasia took place, which led to great deformity. The practical teaching of these cases is not only that these new growths should be thoroughly removed, but that great care should be taken that their sites shall not become the foci of hyperplastic new formations which later on may become malignant.

**Diagnosis.**—So well marked are the features of full-developed vegetations that their nature is readily recognized. When, however, they have undergone condensation and have become flattened, they may be mistaken for condylomata lata, especially when the latter have become hypertrophic. The latter usually have a clear syphilitic history, and are perhaps accompanied by other specific lesions, active or declining. Condylomata lata begin as small flat, papular, firmly-consistent formations, usually of slow growth at first, not very many in number, and may thus remain for a long time; whereas the vegetations or warts grow rapidly and present the cleanly-cut features already given. In many cases of chronic metamorphosed simple vegetations, so close is their resemblance to condylomata lata that their nature can only be determined by a painstaking study of the case. The hard form of wart found in older subjects is very often a sign of evil omen. Portions should be removed and their nature determined by the aid of the microscope.

**Prognosis.**—Though of simple nature, vegetations, from their great exuberance of growth, should never be slightly regarded. Their frequent causation of acute purulent inflammation in both male and female, their tendency to induce phimosis, with gangrene and perforation of the prepuce and paraphimosis, their interference with the functions of the female genito-urinary tract, and their liability when large to become gangrenous, should be borne in mind and explained to patients. Further, their inevitable growth and reproduction should not be forgotten. Then, again, particularly in old subjects, they are, as we have seen, prone to undergo malignant degeneration—usually in women earlier than men. It may be stated, without fear of contradiction, that a large proportion of the cases of epithelioma of the uterus and vagina and of the penis have begun in a seemingly insignificant wart. It is the duty of the surgeon to impress upon the patient the fact that as middle age approaches and increases warts on any portion of the body are menaces to his or her

safety. This is particularly true as to the genital organs of both male and female. An aged male patient, having from any cause difficulty in retracting the prepuce with warts around or beneath it, should be informed that they are especially prone at his time of life to undergo malignant degeneration.

**Treatment.**—The indications for the treatment of vegetations are their complete removal and the prevention of their return. In every instance the immediate and accessory parts should be thoroughly washed or irrigated with solutions of carbolic acid (1:100) or of the bichloride of mercury (1:2000); then the surfaces and interstices of the warts should be thoroughly coated with an 8 per cent. solution of muriate of cocaine. In very nervous subjects and in men, but especially in women in whom the lesions cover a large or delicate surface, mild chloroform or ether narcosis may be required. This condition being induced, the necessary treatment can be more thoroughly and easily instituted.

It may be stated as an axiom that surgical procedures for the removal of vegetations are much more rapid and effectual than caustics are. The latter, however, are useful under certain circumstances. When the vegetations are small, they are readily removed by the dermal curette or Volkmann's spoon, the scraping being carried well to the level of the tissues, which, however, must not be wounded. A solution of persulphate or perchloride of iron should be carefully touched to the bleeding points, and the parts when dry quite firmly covered either with iodoform or absorbent gauze—never with watery solutions. Such is the tendency to recurrence of these growths that the cure cannot be considered complete until the surfaces are smooth. In cases of recurrence before the little growths have reached much salience, chloro-acetic acid, lactic acid, acid nitrate of mercury, nitric acid, the various solutions of iron just spoken of, and strong tincture of iodine, may be employed. Bichloride of mercury (thirty grains to the ounce of collodion) or salicylic acid (one drachm to the ounce of the same fluid) is sometimes a very effectual solution for small warts and those for which curetting is contraindicated.

Strong solutions of chromic acid (3j to ʒiv to the ounce of water) have been used by some surgeons in the treatment of warts. I regard this deliquescent drug as a very inappropriate, and even dangerous, agent in the treatment of these cases. Its action is subject to no control, and when applying it to warts we never positively know how deeply we are cauterizing into healthy tissue. Then, again, it produces eschars which are slow in being thrown off and in subsequent healing. Dr. J. W. White<sup>1</sup> has reported the case of a young woman who had a very large mass of warts on the genital, pubic, and anal regions. To this mass half an ounce of a watery solution of chromic acid, one hundred grains to the ounce, was applied. The woman passed a restless night, and died twenty-seven hours after the application in collapse. Having so many efficient and harmless agents at our command, it is well to leave this particular one alone.

Sessile or pedunculated warts of an area of an inch or more may be readily removed by strangulation with a silk ligature. In some cases this object may be accomplished by the elastic ligature, using the ordinary small India-rubber bands, fixed firmly around the base of the warts; still, in all cases in which it is practicable scraping is the best treatment.

<sup>1</sup> *Journal of Cutaneous and Genito-urinary Diseases*, vol. vii., 1889, p. 300.

Warts of larger area than an inch are best treated by the galvanocautery loop, since these cases are the only ones in which this method of removal is really indicated. Their removal must be slowly and carefully effected with the least loss of blood. Their further treatment is similar to that of the small growths. Rigid antisepsis is required in every case.

In cases in which the warts are seated under a tight prepuce the utmost care should be observed that inflammation be not produced, since phimosis would inevitably occur and delay the cure. In many cases of both sexes, particularly when the lesions are very large and exuberant, I have repeatedly seen the most satisfactory results follow a preliminary treatment of immersing or bathing the parts for as much as an hour several times a day in water as hot as can be borne. By this means the hyperæmia and hyperplasia of the tissues under and around the warts are reduced, and these growths become smaller and more condensed, and are more readily tied or ablated without the troublesome hemorrhage which is otherwise so constant.

The utmost care must be observed in removing vegetations about the meatus, and when possible scraping or tying should be employed. When these means are impracticable, the salicylic or bichloride collodion or tincture of iodine may be used very carefully. The idea is to simply remove the new growth and avoid damaging the parts and causing stricture of the meatus. As a rule, acids are contraindicated in this region.

In cases where operative procedures are not admissible, whether owing to the size or situation of the warts, it is well to apply freely to them, after the preliminary fomentations with very hot water, followed by washing with bichloride or carbolic solutions, equal parts of calomel and salicylic acid. At Charity Hospital I have cured many unpromising cases by this method.

Bockhart<sup>1</sup> speaks very highly of plumbum causticum in the treatment of vegetations. This preparation in a 33 per cent. solution of oxide of lead is a strong potash solution and forms a grayish-green turbid mixture. It should be applied very carefully to the warts alone, the surrounding parts being smeared with vaseline. In a number of cases thus treated by me the warts were promptly converted into black gummy masses, which fell off in a few days, leaving a slightly reddened surface. The agent is worthy of use.

Warts on the female genitals should be treated on the lines just indicated, care being taken that their removal be completed without damage to the tissues. When seated around the urethra or vaginal orifice several of the methods of removal may be necessary, the surgeon always aiming to preserve the lumen of these canals. When practicable, frequent copious injections of very hot solutions of the bichloride (1:2000 or 1:5000) should be used and the parts kept as dry as possible. There is a popular fallacy that warts in pregnant women should not be removed for fear of producing abortion. This view was the outcome of the old and now happily nearly obsolete treatment by vigorous and intemperate cauterization, which produced great vulvar and vaginal inflammation, and sometimes rigidity, even stenosis, of the genital tract. No such results are produced when the growths are removed by curetting or other surgical means supplemented by rigorous antisepsis. Since vegetations may act as

<sup>1</sup> *Monatshäfte für Praktische Dermatologie*, vol. vii., 1888, pp. 273 et seq.



impediments to parturition by reason of their own size and position and of the œdematous hyperplasia which they cause, they should always be promptly and thoroughly removed.

Cæsar Boeck<sup>1</sup> recommends a 4 to 6 per cent. watery solution of resorcin in cases in which relapses show a tendency to occur after curetting. This is to be applied on gauze or cotton encircling the penis or over the female genitals. He sometimes uses resorcin in combination with sugar, bismuth subnitrate, and boric acid, in the proportion of 8 of resorcin to 1 of the powders just named. He claims prompt and effectual results.

The treatment of the hard vegetations of the skin has for its object their evulsion or their absorption and withering. Very active measures are liable to cause dermatitis of the parts around the genitalia. If there are but few of them, they may be curetted and treated like the soft variety. If they are numerous, and if curetting is contraindicated for any reason, after careful cleansing of the whole surface and ablution with carbolic or bichloride solutions of the strength already mentioned, each may be touched separately with the bichloride or salicylic collodion, and the parts kept dusted with subnitrate of bismuth, magnesia, boracic acid, starch, or infant's powders. When these skin-warts have undergone desiccation and corneous degeneration their removal is often difficult, and the following preparation will be found efficient:

R. Acid. salicylic.,	
Chrysarobin.,	āā. ʒss;
Collodion flex.,	ʒj.—M.

They should be kept covered with this continually.

After removal the surgeon should explain to the patient the conditions under which warts grow and luxuriate, with a view to prevent their recurrence.

In persons beyond forty years of age persistent recurrence of an originally simple wart should always awaken suspicion of malignancy, and prompt and radical extirpation should be practised.

## CHAPTER XXXVIII.

### HORNY GROWTHS OF THE PENIS.

TRUE horny growths of the penis are sometimes seen, and there are in literature less than twenty cases reported.

These growths are of two kinds: first, horny plates of varying thickness, which may extend in depth and constitute a distinct nodule, or consist of a band or ring encircling the glans penis; and, second, projecting horns. In some cases both forms of new growth are present.

<sup>1</sup> *Monatshäfte für Praktische Dermatologie*, vol. v., 1886, pp. 93 et seq.

Horns of the penis take their origin at the corona in the coronal sulcus, and on the inner aspect of the prepuce, particularly near the frænum. They can better be pictured than described. Figs. 172 and 173 rep-

FIG. 172.

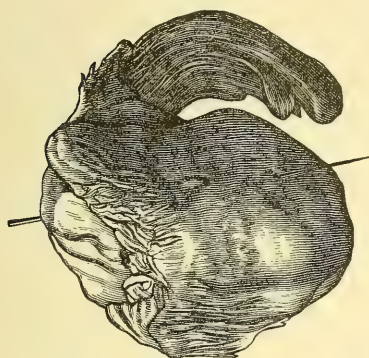
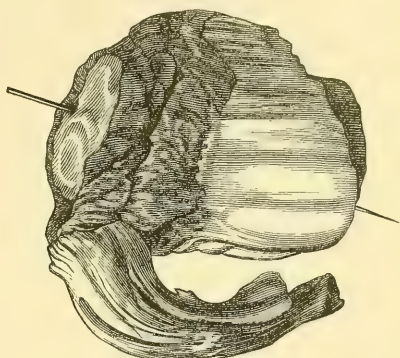


FIG. 173.



resent appearances presented by a case reported by Dr. J. H. Brinton.<sup>1</sup> On the dorsum (see Fig. 172), half an inch in front of the corona, was a longitudinally striated plate of horny tissue varying in width from three-quarters of an inch to an inch, which encircled the end of the glans and narrowed the meatus to a pin's point. The horn sprang from the under surface of the glans and jutted forward and upward, being curved in conformity with the end of the glans. The under surface of the horn and horny plate is shown when the penis was laid against the abdomen. (See Fig. 173.) In this case the horn, which tapered slightly toward its end, was one and seven-eighths inches long and three-eighths in circumference at the base. A case reported by Pick is even more remarkable and striking in its appearance. The large horn sprang from the prepuce and glans, its base being imbedded like a nail in its matrix on the right side down toward the frænum. From this base the horn jutted downward and upward to the left or front of the meatus. From the base of the glans several small horns sprang, and showed a tendency to curve upward in front of the glans. When the penis was laid against the abdomen the large horn presented an appearance not unlike the crest of a dragoon's helmet. The large horn was two and a half inches long.

These horns of the penis are usually developed from warts in persons in whom there has been some chronic irritative process on the prepuce and glans. They have been observed in persons having long, tight, and straight prepuces, in those who suffered from balanitis and balano-posthitis, or whose parts were rendered hyperæmic by uncleanness. Their chief starting-point of development is the coronal sulcus, especially down toward the frænum.

Horny plates and rings are very rare.

In color these growths are brown, greenish-brown, and even black.

<sup>1</sup> "Horny Growths of the Penis," *Med. News*, Aug. 6, 1887. This essay gives a tolerably complete bibliography of the subject. Many of the cases in literature are described in an unsatisfactory manner. The reader is also referred to an essay by Peck, "Zur Kenntniss der Keratosen," *Vierteljahrs. für Derm. und Syphilis*, vol. vii., 1875, pp. 315 et seq.

There may be but one horn or there may be several. They are of varying lengths, from half an inch to three and a half inches long. In all the reported cases they were curved when they had attained a length of an inch. They vary in breadth at their base according to their size, and gradually taper off toward their distal portion, which is usually truncated. As a rule, they give rise to no pain, though some patients have complained of itching and even burning sensation. They act as mechanical hindrances to coitus, and may more or less impede or obstruct urination. In some cases epithelioma has been known to coexist with and follow the ablation of these growths. They are mostly seen in elderly men of from fifty to seventy years, but in Jouett's<sup>1</sup> and Pick's cases the subjects were twenty-two years old, and in Demarquay's the boy was nineteen and a half years old.

Microscopically, horny growths of the penis are seen to consist of fibrillated layers of densely-packed epidermic cells.

The **treatment** of these growths is by thorough ablation, taking away portions of or the whole of the glans if necessary. They sometimes return after removal.

## CHAPTER XXXIX.

### CANCER OF THE PENIS.

CANCER of the penis, according to the statistics from reliable sources collected by Kaufmann, stands seventh in frequency of all cancers in the male sex, and constitutes  $5\frac{5.2}{100}$  of all cancers in that sex. According to the statistics of Demarquay<sup>2</sup> in 97, and Kaufmann<sup>3</sup> in 130, cases, this form of cancer belongs to the more advanced years of life. In the sixth decennium (from fifty to sixty years) one-third of all the cases of cancer of the penis began. Next in order is the fifth decennium (forty to fifty years) and the seventh (sixty to seventy years), in which there is the same frequency. It is much less frequent earlier than the fortieth year. The combined figures of Demarquay and Kaufmann are as follows:

Age.	No.	Per cent.
21 to 30 years . . . . .	14 cases . . . . .	6.1
31 to 40 years . . . . .	23 cases . . . . .	10.1
41 to 50 years . . . . .	50 cases . . . . .	22.0
51 to 60 years . . . . .	68 cases . . . . .	30.0
61 to 70 years . . . . .	50 cases . . . . .	22.0
71 to 80 years . . . . .	19 cases . . . . .	8.4
81 to 90 years . . . . .	3 cases . . . . .	1.4

In the greater number of cases cancer of the penis begins on the prepuce, in a rather smaller proportion of cases on the glans, sometimes on

<sup>1</sup> *New York Med. Times*, 1853, p. 79.

<sup>2</sup> *Maladies chirurgicales du Pénis*, Paris, 1877, pp. 387 et seq.

<sup>3</sup> *Verletzungen und Krankheiten der Männlichen Harnröhre und des Penis*, Stuttgart, 1886, p. 264.



glans and prepuce, and, again, exceptionally, on the cutaneous sheath of the penis. Jacobson<sup>1</sup> mentions the case of a man, aged fifty-five, in whom a primary carcinoma in the form of a fungating ulcer two and a half inches long was found on the floor of the urethra, with masses growing into the substance of the penis.

It sometimes happens that cancer of the penis occurs from extension of the disease from the scrotum.

**Etiology.**—Besides that unknown factor—tissue-susceptibility or predisposition—and certain unknown conditions (in the majority of cases) incident to age, chronic irritation seems to be the great cause of cancer of the penis. Since phimosis is a frequent cause of chronic balanitis and balano-posthitis in which the irritative process is active, this condition takes a prominent place in the etiology of penis-cancer. This form of new growth, however, is not at all confined to cases of phimosis, but is seen in persons with normal roomy prepuces, and quite rarely in those having little if any prepuce. In all probability, the personal habits of the man in very many cases have much to do with the development of cancer of the penis. When the organ is kept clean and dry, even in the aged, it is fair to suppose that cancer will not attack it. On the other hand, uncleanness, with the resulting harboring of decomposed secretions and of dirt, tends to cause a chronic irritative process which may, the condition of the patient's system favoring it, eventuate in malignant degeneration. The occurrence in the majority of instances of penis-cancer in men of the lower walks of life, whose care of the person is generally very scant, seems to me to warrant the opinion that the disease is largely due to the results of uncleanness.

The subject of protozoa as appertaining to cancer is yet so vaguely understood that speculation upon it is deemed inexpedient.

Demarquay considers that syphilis is the second etiological factor in the development of cancer of the penis. It is true that in the mouth and on the tongue a chronic irritative process due to syphilis not infrequently leads later on to epitheliomatous degeneration, but I know of no such condition of the prepuce caused by syphilis. Later syphilitic disease of the penis shows itself largely in subcutaneous hyperplasiæ, which commonly yield promptly to treatment. It is possible for a chronic gummatous nodule of the prepuce or the glans to constitute an irritative process in the mucous membrane which may lead to epithelioma, but I have never seen or heard of such case. I once saw a case of cancer of the penis which had its origin in the scar left by an exuberant and persistent initial lesion which had been present many years before. Therefore, syphilis can hardly be considered other than as a very exceptional etiological factor in cancer of the penis. The scars of chancroidal ulcers may, like those left by syphilitic lesions, cause chronic irritations which may lead to epithelioma.

There are reported in literature, according to Kaufmann, but five cases in which cancer of the penis followed an injury. In two cases the organ was crushed, and in one it was torn at the frænum. The fourth case is that of Dupuytren, in which malignant degeneration began in the penis of a patient who had for four or five years worn two small gold padlocks affectionately placed on the organ by his sweetheart as a safeguard to his

<sup>1</sup> *The Diseases of the Male Organs of Generation*, London, 1893, p. 709.

loyalty. The fifth case was reported by Krönlein of a man twenty-seven years old whose prepuce was nearly torn off by the bite of a horse. A symmetrical wound was made by the surgeon, but before healing was complete the organ was again bruised, and then cancerous degeneration set in. I recently<sup>1</sup> reported a case in which a healthy man twenty-five years old had a pea-sized pustule on the side of the penis. This lesion was picked by the patient by means of a pin, and severely burned on many occasions with various caustics. The result was an epitheliomatous nodule.

A case is reported by Bruce<sup>2</sup> in which he thought that cancer of the penis of a man was due to coitus with his wife, who suffered from cancer of the uterus. Demarquay also mentions a similar case. Such a mode of origin, however, is very doubtful. In this connection it is well to remember the case of the Spanish grandee reported, with much naïveté, by Diday,<sup>3</sup> in which the austere hidalgo had repeated connections with his wife, who was suffering from cancer of the uterus attended by a sickening discharge. This worthy was tormented by remorse on account of marital transgressions, and labored in vain, by daily coitus, to contract gonorrhœa from his wife as a punishment for his disloyalty. He contracted neither gonorrhœa nor cancer.

Demarquay reports a case in which cancer of the penis originated in a urinary fistula.

There are no facts at hand to warrant the assumption that cancer of the penis may more or less remotely originate in heredity, except the case of Bruns, quoted by Kaufmann, in which the mother of a man suffering from cancer of the penis was said to have died of cancer of the breast.

**Course and Symptoms.**—In many cases of epithelioma of the penis the initial symptoms are very insignificant, and they may pass unheeded, especially by patients of the lower walks of life. Usually intelligent subjects give a history of a mild pruritus or of a slight burning sensation at the date of onset of their trouble. The truth is, that the condition of the prepuce and the habits of the patient have much to do with the mildness or intensity of early symptoms. When there is marked phimosis there is apt to be much itching and burning in the affected part, and these symptoms are rendered much more severe by uncleanness.

Epithelioma of the penis usually begins in men who have suffered from chronic balanoposthitis, from phimosis, and somewhat rarely from chronic relapsing herpes. In fact, any chronic irritation may give rise to this disease.

In chronic balanitis and balanoposthitis the epithelial layer of the glans and prepuce becomes much thickened, while there is much increase and condensation in the submucous connective tissue. This chronic condition, which is attended with pain, itching, and burning sensations, which are often paroxysmal and almost unbearable, is a very favorable basis upon which epithelioma may develop. I have seen several well-marked cases of this form of epithelioma, concerning which little has yet been written. In these cases warty growths may appear, and in the course of time (months or years) a fungating mass may be developed at the end of the penis.

<sup>1</sup> *Journal of Cutaneous and Gen.-urin. Diseases*, June, 1891, p. 305.

<sup>2</sup> *Transactions of the Pathological Society, London*, 1879, p. 477.

<sup>3</sup> *La Pratique des Maladies vénériennes*, Paris, 1890, pp. 15 et seq.

Then, again, the cancerous growth begins in another way. One or more fissures or thickened patches appear either in the mucous layer of the prepuce, usually the seat of chronic irritation, or at its free margin or in the coronal sulcus. Then chronic rebellious ulceration of a low grade appears, and the parts become more and more hard until a dense, almost

FIG. 174.



Cancer of the penis, showing very large fleshy masses.

ligneous, patch or nodule is developed. From this starting-point large masses of indurated tissue develop, which produce exuberant lesions and much deformity. In these cases there is no evidence of warty or cauli-

FIG. 175.



Showing the posterior surface of the glans penis after amputation.

flower growth, but large, irregular, fleshy masses, in the interstices of which a curdy, smegma-like secretion, besides pus and a horribly fetid sanies, is secreted. This condition is well shown in Figs. 174 and 175.



which represent the appearances presented by a case of my own in which the new growths formed a mass as large as a good-sized orange. The glans penis was the part involved, and the new growths were seated at right angles with the long axis of the penis. From the apex of one of the masses the urine escaped freely. The color of the masses was of a dirty grayish-white. In these cases hemorrhage, more or less profuse, sometimes even alarming, is not uncommon.

Chronic ulcers of the penis, left untreated, or, as is so common, badly treated by injudicious stimulation and cauterization, may be the starting-point of cancerous degeneration like that just described. Sometimes they give rise to warts, which soon degenerate into epithelioma. The cases of cancer of the penis which originate in chronic ulceration are less frequent than those having other modes of origin. Whenever in a middle-aged or elderly man a very chronic rebellious ulcer of the penis, with considerable infiltration, is observed, and syphilis as a cause has been excluded, the fear of cancerous degeneration may be entertained. Chronic chancroid usually presents such features that its nature is readily recognized.

The most common mode of origin of epithelioma of the penis is in warty growths, which may promptly, or after the lapse of months and even years, degenerate into epithelioma. Such is the liability of vegetations to undergo degeneration in those of middle age, and particularly in elderly persons, be they weak or strong, that their presence should immediately demand at the hands of the surgeon prompt care and treatment.

Vegetations of the penis chiefly begin about the coronal sulcus and the inner layer of the prepuce near it or the frænum. Sometimes these growths are warty, cauliflower-like, or vegetative, and are of the pointed variety; and in these cases the progress of the degenerative changes is usually rapid. It is always difficult, and often impossible, to say where benignity ends and malignity begins in these growths. In some cases the exuberant development is rapidly accomplished, and a mass of cauliflower appearance as large as a lemon or an orange is found at the end of the penis in a year or even less. Exuberant development of warty growths in middle-aged and elderly subjects is always a very suspicious symptom. As time goes on the warty, cauliflower appearance is lost, and the new growths look like fleshy masses.

Then, again, we see cases in which the patient presents a little nodule or a patch of hard, warty growth on the penis, looking something like the seed-warts seen on boys' hands and knuckles. He complains of little if any discomfort, perhaps a little pruritus. This seemingly insignificant lesion grows slowly and in a cold manner, and months and even several years may elapse before it reaches such a size as to become annoying. Then it may be cut out, only to reappear later on in the cicatrix. After that amputation of the penis is usually performed. I have seen several such cases as these in which the microscope revealed malignancy in the tissues, and in which amputation of the penis enabled the patients to reach a good old age without any further symptoms of cancer. It is not well, however, to generalize on the few cases seen in one man's experience.

There is still another, but rather rare, mode of invasion and development of cancer of the penis of which I have seen several examples. In middle life and beyond patients sometimes consult the surgeon for a chronic mildly scaling affection of the glans or prepuce, or both. The

symptoms attending this condition are usually not well marked, and they may consist only of occasional slight heat or itching. The morbid areas show slight thickening of the tissues and a constant desquamation of small scales or even lamellæ. This affection often goes on in the most exasperating manner in spite of well-directed treatment, and even in persons whose prepuce is short. Having existed usually several years, the thickening of the tissues becomes greater, and then the new growth more or less rapidly develops and forms large fleshy masses like those of Figs. 174 and 175. In these cases, in all probability, the morbid change is first a mild irritative process in the epithelium, which later on takes on malignant degeneration. Schuchardt reports<sup>1</sup> an interesting case which belongs to this category, in which a condition of the mucous membrane resembling psoriasis or leukoplasia buccalis existed before the onset of the malignant disease.

When epithelioma of the penis is fully developed the symptoms become more pronounced than they were at first, and new ones are complained of. In some cases lancinating pains in the penis and parts beyond are more or less troublesome. As the new growth increases in size, coitus becomes more and more difficult and painful, and later on impossible. Usually there is no tenderness about the new growth, and handling and even pressure cause no discomfort. When the meatus is pressed upon, particularly by new growths on the glans or by those of the prepuce, difficulty in urination may be experienced. In some cases, notably one reported by Boyer, retention of urine was thus caused. In these cases the urethra becomes stenosed by the new growth, but in a short time the urine tunnels a way for its exit and escapes in some of the clefts or fissures in the new growth.

In the later stages hemorrhages occur, and they are sometimes very troublesome, and deplete the patient by their copiousness. The most annoying complication is the low grade of ulcerative process which goes on in the interstices of the masses and on its surface, and produces a horribly fetid secretion, rendering the patient an object of disgust to himself and those with whom he comes in contact.

Some patients complain of painful erections more or less constantly during the progress of the new growth.

As a rule, the health of patients in whom epithelioma of the penis develops is good in the early days, and it thus may remain for several years. Then, again, as time goes on some patients lose flesh, become sallow and weak, and present evidence of deep cachexia. My studies and observations lead me to think that when the new growth is rather small and increases slowly (particularly in the cases beginning in an old seedwart, in a fissure, or in a scaling patch) the health remains for a long time unaffected. In these cases the enlargement of the inguinal ganglia may not be found until very late, even when they are carefully and repeatedly looked for. On the other hand, when the new growth is rapid and exuberant the health is sooner affected, and the enlargement of the ganglia is noticed much earlier.

Under the title "*Epithéliome bénin syphiloïde de la verge*" Fournier

<sup>1</sup> "Beiträge zur Entstehung der Carcinome aus chronisch entzündlichen Zuständen der Schleimhäute und Hautdecken," *Volkmann's klinische Vorträge*, No. 257, p. 16. Schuchardt gives the microscopical details of this case.

and Darier<sup>1</sup> describe a peculiar lesion observed in a man aged sixty-five years which first appeared four years before. The lesion consisted of a rounded, deep carmine-red plaque of ten centimetres extent, seated on the dorsal internal surface of the prepuce, sulcus, and corona glandis. It had a distinct velvety surface with no signs of ulceration or vegetation. To palpation simple thickening of the tissues was revealed. The prepuce could be retracted with slight pain. The lesion began, according to the patient's statement, four days after a very suspicious coitus. There was no ganglionic complication. The patient suffered besides from the results of generalized atheroma. The microscopical examination of this lesion showed great hyperplasia of the epidermis, with marked enlargement of the papillae. Its chronic indolent course shows that the only efficient treatment is complete removal of the new growth. The lesion seems to be the result of a chronic irritative process.

The deformities and distortions of the penis produced by cancer are many and surprising. Those shown in Figs. 174 and 175 are very well marked, and show the exuberant development of the growth, which is in

Fig. 176.



Epithelioma of the glans and prepuce, with a secondary mass farther up the penis.

a chronic stage and no longer presents a warty or cauliflower-looking appearance. In Fig. 176, reproduced from Demarquay, the well-marked cauliflower growth is seen at the end of the glans and prepuce, and a secondary mass, due to lymphatic infection, is seen about the middle of the penis. In the greater number of cases the disease is localized to the preputial and glandular portion of the penis, and it luxuriates in the various forms depicted. The corpora cavernosa, with their firm fibrous sheaths, offer a strong barrier to the cancerous invasion, which may remain intact for years. Consequently, there is a tendency in most cases to the localization of the disease to the distal portion of the penis. It sometimes develops farther up the organ, its cells having been carried there by the lymphatics. It is rare to see involvement of the whole organ by cancer in the primary attack. But extension may occur by means of the corpus spongiosum, in which case the whole organ may be later on involved.

Recurrence of the cancer in the stump often leads to its full involvement, the corpora cavernosa no longer acting as a barrier.

Many other appearances are presented by cases of cancer of the penis, but the illustrations here given will, I think, serve as guides for its diagnosis. It must be borne in mind that the typical cauliflower or warty appearance is sooner or later lost, and replaced by fleshy nodules, masses,

<sup>1</sup> *Annales de Derm. et de Syphil.*, tome iv., May, 1893, pp. 613 et seq.



and tabs. Sometimes these masses become superficially ulcerated, and again they may undergo more or less necrosis, and sometimes large portions of them slough off.

As a rule, patients suffering from cancer of the penis do not seek surgical relief promptly.

Intelligent patients and those careful of the condition of their genitals usually present themselves to the surgeon early in the course of their malady. But those of the lower walks of life, such as we see in dispensaries and hospitals, as a rule do not present themselves until the new growth is quite well advanced. In the statistics of fourteen cases of v. Winiwarter there was an average of twenty months elapsing from the beginning of the trouble, while in Kaufmann's thirty-eight cases there was an average of twenty-two months; so that we may say, as a rule, that in private practice patients with cancer of the penis usually apply for treatment within two or three years after the onset of the affection, and sometimes earlier.

For a greater or less length of time the inguinal ganglia seemingly remain unaffected. We have no reliable statistics, however, showing the date at which cancer attacks these structures. In most cases the patient is seen late in his affection, and then the ganglia are found to be attacked. As a general rule, the ganglia are affected on both sides, and only on one side in about one-third of all cases. Ganglionic involvement is determined by the site of the cancerous growth; if that is unilateral, the groin swellings are unilateral, but if the whole organ is involved, both groins are attacked. Gussenbauer<sup>1</sup> very truly says that the neighboring lymphatic ganglia are more frequently involved than we have been in the habit of thinking, and that in nine operated cases gland-infection was found in two instances with the aid of the microscope. It is very probable that minute malignant changes may take place in their structure which are not evident to our most careful palpation. Kaufmann says that the general impression that the glands in cancer are not diseased *in toto* is correct, but that out of forty-eight operated cases only eight were seen in which there were no glandular changes; hence that it happens in the majority of cases. I recall a case in which epithelioma of the penis existed for six years before operation, at which time there was no apparent glandular complication, and the patient lived ten years after without any metastasis of the disease. This, however, was a remarkably favorable course of events for cancer of the penis.

When affected by cancer the ganglia of the groin and also of the thigh become hard, smoothly enlarged, separable from each other, and movable under the skin. They may thus remain for months or for several years. Then, again, exuberant cancerous development may take place in them, and they may become transformed into large round, oval, or lobulated tumors. This cancerous mass may remain unchanged, but it usually causes ulceration of the overlying skin. Owing to the proximity to the femoral vessels, mild or severe hemorrhages are liable to occur from erosion of their walls by the cancerous growth.

A second order of phenomena may occur in these cancerous buboes. The glands more or less promptly undergo acute inflammation, suppura-

<sup>1</sup>"Ueber die Entwicklung der Secundären Lymphdrüsen-Geschwülste," *Prager Zeitsch. für Heilkunde*, 1881, Band 11, p. 17.

tion ensues, and the pus either forces an outlet or is evacuated by the knife. In most cases the morbid process does not stop with the destruction of the glands. The connective tissue and the skin become the seat of secondary infection, and there is then produced a formidable cancer in the groin.

Primary cancer of the urethra is very rare. Griffiths<sup>1</sup> reported one case, and Oberländer<sup>2</sup> another, in which by means of the endoscope he found the cancer near the bulb of the urethra.

Strange as it may seem, tertiary metastasis from the secondary groin-cancer is the exception rather than the rule. It is rare to see general diffusion of malignancy in cancer of the penis. According to Kaufmann, the viscera were seen to be affected by v. Winiwarter in one case, by Read in one, by Lebert in two, by Louis in one, by Kocher in one, and by Kaufmann in one remarkable case in which the cancerous diffusion was carried by the femoral vessels, which had become infected by cancerous inguinal glands, making seven in all literature.

Death, therefore, from cancer of the penis occurs in two ways. First, and most commonly, by a cachexia which is developed by the poisonous fluids derived from the infected ganglia, and, secondly, as a result of metastases into the lungs, pleuræ, liver, heart, and other organs.

Death from hemorrhage has been noted, but that is an accident.

The involvement of the inguinal ganglia in epithelioma of the penis is inevitably followed by death at an early or late date.

There are a number of cases reported in medical literature in which swelling of the inguinal ganglia has subsided and disappeared after amputation of the penis. It is suspected that these glands were the seat of simple inflammation, and as a result resolution occurred. This happy outcome is very rare and scarcely to be looked for. There is usually more or less pain during the course of cancer of the groin. As the cancerous mass in the groin grows old and larger, a deep cachexia attacks the patient. He looks pale and ashen, loses strength and flesh, and so continues until death relieves him of his hopelessness and misery.

**Diagnosis.**—The diagnosis of cancer of the penis may be difficult in the early stages of the growth. The existence of chronic or oft-recurring irritation of the glans or prepuce, followed by a localized warty growth or indurated exulcerated patch or nodule, should always excite a suspicion of cancer, particularly in elderly men, and more especially when the existence of syphilis has been excluded. Then, again, the behavior of the lesion under treatment may give a clue as to its nature, for simple processes are usually amenable to proper management, while the malignant forms go on unchecked and uncured. Constant examination of the lymphatic ganglia is necessary, since their enlargement under these circumstances will frequently lead to a correct diagnosis of cancer. Portions of the growth should be examined with the microscope as early as possible.

In the statistical table already given it is shown that between the twenty-first and thirtieth years of life cancer of the penis existed in 6.1 per cent. I am strongly of the opinion that this rate is too high, and I have no doubt that in some of the cases the diagnosis was imperfectly

<sup>1</sup> *Lancet*, Feb. 9, 1889.

<sup>2</sup> *Internat. Centralbl. der Harn. und Sexualorgane*, vol. iv., 1893, pp. 244 et seq.

made. On five occasions which I distinctly remember I have had cases referred to me as being those of cancer of the penis in which amputation was decided upon, which were really instances in young men of exuberant hard chancre. Hard chancres of the prepuce, and sometimes of the glans, occasionally assume huge proportions from the occurrence of hard oedema around them. Then it frequently happens that the healing surface becomes papillated or coarsely warty. In this condition a hard chancre is quite frequently diagnosticated as of cancerous origin by reason of its ligneous hardness, its aphlegmasic course, and its warty appearance. The complicating inguinal adenopathy is then construed to be an evidence of cancer and secondary infiltration of the ganglia. I feel certain that cases like these have swelled the statistics of cancer of the penis in men between twenty and thirty years of age. There is no doubt, however, of the occurrence of cancer in young persons, but it certainly is not frequently observed. Any warty mass or patch on the penis in persons of middle and advanced life, syphilis having been excluded, should be regarded as a danger-signal, and it should be promptly and radically removed. The microscope then will reveal the nature of the ablated tissue.

When seen, as most cases are, late in the development of the cancer of the penis, its diagnosis is usually very easy. The large, fleshy, hard masses, their fungating appearance, the distortion produced, and the fetid secretion, all point to cancer of the penis. Still, it frequently happens that cases presenting the foregoing typical appearances are regarded as syphilitic and are treated for that disease.

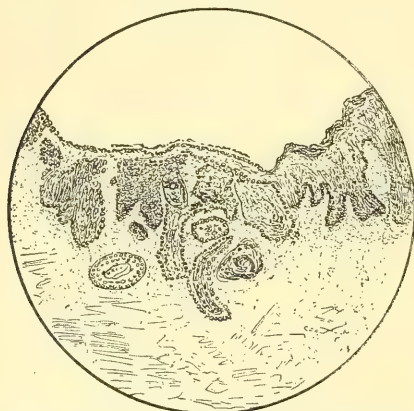
**Prognosis.**—This depends upon the time at which the cancer is seen and its nature recognized. If seen early and the growth is small and favorably situated for removal, its ablation may give to the patient future immunity. If the new growth is very large and if it has existed for several years, the prognosis is less favorable. In any case the condition of the inguinal lymphatic ganglia gives the most reliable prognostic data. If the glands are but slightly enlarged and show an indolent tendency, a year or many years may elapse before a fatal termination results.

Cancer of the penis is so well localized and so sharply limited in many cases that the conditions for its removal and extirpation are more favorable than upon other regions. Still, the sad fact stares us in the face that in the vast majority of cases cancer of the penis almost inevitably leads to death. Yet there are cases reported in literature which will give hope to the afflicted. These have been gathered by Kaufmann. Fabricius Hildanus reports the case of a man eighty years old who lived ten years after the ablation of an enormous cancer of the penis. Roux operated on a man for this disease who lived many years after and died of another disease. Lebert says that he has seen cancer of the penis cured. Podraski relates two cases in which nine and eleven years have elapsed after operation, and yet there are no signs of recurrence of the cancer. Thiersch reports that in three out of eight cases operated on by him there has been no recurrence in four, six, and seventeen years. In none of these cases were the inguinal glands enlarged. v. Winiwarter knows of three cases in Billroth's practice in which two, six, and seven and a half years have elapsed since the operation. Out of six cases Rose claims that he has cured three cases fully, and that one lived five years



and one month after the operation, while the two others died respectively six and three years thereafter. In my own case, already spoken of, ten years elapsed after operation, and then the patient died of another disease.

FIG. 177.



Section of glans penis through epitheliomatous mass;  $\times 75$ .

and mucous follicles are seen to be infiltrated with epitheliomatous elements and the so-called nests or pearls. In Fig. 178 epitheliomatous

Recurrence of this disease in the stump is not uncommonly seen. Statistics on this point, however, are not sufficiently clear and reliable. This accident probably occurs in about 25 per cent. of all cases.

Amputation of the penis has been mentioned as having led to melancholia, and to have so preyed on the minds of some men that they committed suicide. These, however, are unusual results.

**Pathological Anatomy.**—Cancer of the penis is of the epitheliomatous variety, being the ordinary skin-cancer involving squamous epithelium. In Fig. 177 is shown a section through a prepuce the seat of epithelioma. The papillæ

FIG. 178.



Infected inguinal ganglia from epithelioma of penis; camera lucida drawing;  $\times 200$ .

infiltration is shown in the alveoli of an inguinal ganglia secondarily infected from the penis. In Fig. 179 epitheliomatous infiltration is

shown in newly-formed connective tissue of the groin after suppuration and extrusion of epitheliomatous ganglia. The upper part of the cut shows the typical alveolar arrangement, with bundles of new connective tissue between the alveolar spaces filled with epithelial cells. The lower part of the cut shows granulating tissue from small cells, bundles of con-

FIG. 179.



Epithelioma of connective tissue of groin, secondary to epithelioma of penis.

nective tissue more fully developed, the whole mass invaded here and there by rapidly-growing flat epithelial cells. These microscopic drawings were made by Dr. E. M. Culver from sections taken from my own cases.

**Treatment.**—According to the severity of the case amputation or extirpation of the penis may be necessary.

Too much cannot be said in favor of an early and radical operation in cases of cancer of the penis, since such a course gives the patient a much greater immunity to subsequent trouble. In every suspicious case the surgeon should, before operation if possible, remove a sufficient amount of the mass in order that a thorough microscopical study of its nature may be made.

*Amputation of the Penis in its Continuity.*—The patient having been prepared for the operation, the pubic hairs should be shaved off and he should be well washed in the usual antiseptic manner. He is then placed in the lithotomy position and a soft-rubber catheter is quite firmly tied around the root of the penis, in order to control hemorrhage. The surgeon may stand between the patient's legs or on his left side. Then two long bonnet-pins are thrust through the corpora cavernosa, sufficiently well behind the tumor on each side, in an X-like manner, avoiding the corpus spongiosum. Before inserting the pins it is necessary to manœuvre and manipulate a little so as to get the body of the penis back about three-quarters of an inch and to slide the integumentary sheath correspondingly forward. Then, traction being made from the distal and dis-

eased portion of the penis with the left hand or by the aid of an assistant, extension and steadiness are afforded, and a circular incision is made through the integument at the distal portion of the penis, taking care not to cut the corpus spongiosum. Then the corpora cavernosa are cut through downward until the corpus spongiosum is reached. This structure should be carefully dissected out, and fully one-half or three-quarters of an inch should be left to protrude beyond the amputated end of the corpora cavernosa. We then have the latter structures as the stump proper; around it is the ring of integument fully three-quarters of an inch longer than it, and underneath the corpus spongiosum is intact and fully half an inch longer than the stump. At this time the tourniquet is moderately relaxed, and all oozing or spirting vessels are securely tied, one by one, with gut. This part of the operation being well done, the occurrence of secondary hemorrhage, which so often happens and gives so much trouble, may be avoided. The next step is the formation of the urethral orifice. In this procedure we should be guided by our knowledge of anatomy. If only one or two, or even three inches of the penis are removed, the incision into the corpus spongiosum, which should be made with scissors, should be vertical, for the reason that thus far the urethra is a vertical slit. Farther down, where the urethra is a transverse slit, the incision should be transverse. In the first case we have vertical, and in the second horizontal or transverse flaps. Then the tegumentary ring should be stitched to the margins of the corpora cavernosa by means of close interrupted sutures, leaving the formation of the urethra to the last. Then both flaps of the corpus spongiosum must be stitched, in case they are vertical, to the corpora cavernosa, and if horizontal the upper one should be stitched to those structures and the lower one to the integument. Catgut may be used for stitching the urethra. The wound is dressed with iodoform and surrounded by absorbent gauze kept in place by means of a T-bandage. A soft-rubber catheter may be retained in the urethra for a few days, or the urine may be drawn off by means of a velvet-eye rubber catheter of a calibre of about No. 12 French. It may be necessary for a time to use suppositories of morphine to control erections.

The patient will be confined to his bed for about three weeks. As healing takes place in the stump, it is well to carefully watch the new urethral orifice, and, if necessary, to introduce every few days a soft olivary bougie (20 F.). As a result of this operation a good stump is left. There is a redundancy of integument beyond the ends of the corpora cavernosa which will admit of erection of the latter without pain or inconvenience. In many such cases coitus is possible after the operation.

This operation may be performed without the aid of the needles. Hemorrhage being cared for, mild traction is made on the glans, and a circular cut, through the skin only, is made with the scalpel. At the corpus spongiosum the parts may be relaxed so that it can be cut off fully three-quarters of an inch longer than the integument. Then a soft gum-elastic catheter may be introduced as far as the tourniquet. Traction is then carefully made, and at the same time the tegumentary sheath is gently pulled or slid back for nearly an inch, and then a vertical incision is made through the corpora cavernosa quite well back, so as to leave an ample skin-flap. This incision must be carefully made at right angles, so as to ensure a square-ended stump, and as the corpus spongiosum is



reached care must be taken not to wound it. With a little careful dissection it can be disengaged, and it should be cut off squarely about three-quarters of an inch or an inch beyond the stump proper. The further steps of the operation are precisely like those already detailed.

Mr. Treves<sup>1</sup> speaks of section with flap as follows: "Hemorrhage having been provided against, a rectangular flap of skin is cut from the dorsum and sides of the penis, and the dorsal arteries are secured. The flap may be compared in miniature to the anterior flap in an amputation of the thigh. A narrow-bladed knife is then made to transfix at a point on a level with the base of the above flap, between the corpora cavernosa and the corpus spongiosum, and then is made to cut forward, outward, and downward for about three-quarters of an inch. From the smaller inferior flap the urethra is dissected out. The corpora cavernosa are then cut vertically upward on a level with the point of transfixion. The tourniquet is removed, all bleeding points are tied, and the upper or skin flap is punctured at a point opposite to the divided urethra. That tube is drawn through the punctured hole in the flap, is slit up, and stitched *in situ*. The two flaps, upper and lower, are then joined by sutures." Mr. Treves says that it is claimed that a natural skin covering the severed corpora cavernosa is secured, and that quicker healing is induced. It is very doubtful to my mind whether the comfort of the patient would be conserved by this operation. It would seem that sufficient tissue had not been left to allow of free erections. Jacobson says that he has performed this operation in nine cases with excellent results.

Amputation by the galvanic *écraseur* has, in my experience, little to commend it. It is claimed for this operation that hemorrhage is avoided, but such a result is far from being constant. It is performed as follows: A soft catheter is introduced into the urethra, and the platinum wire is carried by means of a needle through the penis between the corpus spongiosum and the corpora cavernosa. The skin is incised in the line of amputation. The wire is then tightened, drawn upward, heated to a dull heat, and made to traverse the cavernous bodies very slowly. Then the corpus spongiosum is to be divided in the same way. Healing after this operation is generally very slow and halting, and primary and secondary hemorrhages are not at all uncommon.

The patient whose penis has been amputated should report to the surgeon from time to time, in order that he may see that the urethra remains patulous. Should it be necessary by reason of contraction, the systematic introduction of an olivary bougie into the urethra may be made every few days or a week for a longer or shorter period.

*Extirpation of the Penis.*—This is accomplished in the easiest way by the operation described by Mr. Pearce Gould.<sup>2</sup> The scrotum should be split into two halves in the whole length of the line of the raphe, back to the corpus spongiosum. A good-sized metal catheter or sound should then be passed as far as the triangular ligament, and the knife inserted between the corpora cavernosa and corpus spongiosum. The latter structure is carefully separated as far back as the triangular ligament if necessary—at any rate, well behind the disease. The sound is then withdrawn, the urethra cut across, and carefully dissected out.

<sup>1</sup> *A Manual of Operative Surgery*, Philadelphia, 1892, vol. ii. p. 657.

<sup>2</sup> *Lancet*, vol. i., 1882, p. 821.

Then an incision is made around the root of the penis on each side up to the central incision below. The suspensory ligament is then cut through, and the crura of the corpora cavernosa are detached by means of the periosteal elevator knife-point or scissors. If the bone is involved, resection must be performed. The urethra is now brought out, slit up vertically, and stitched to the lower angle of the wound in the scrotum. If the testicles have also been removed, the urethra is stitched to the lower angle of the perineal wound. The after-treatment requires care as to cleanliness, the frequent renewal of dressings, and the withdrawal of the urine with a small soft catheter. Jacobson allows his patients to turn on the side and pass the urine into a vessel. He also advises his patients thus operated upon to have a small metal funnel with a long spout which will carry the urine well away from the body.

Mr. Wheelhouse<sup>1</sup> urges the advisability, in some cases of amputation of the penis, of removing the testicles. He speaks of two cases, in one of which this was done, and the other in which it was not done, as follows: "The result in the two cases was as marked as it was different. The two patients lay in contiguous beds, were constantly comparing notes, and never failed to give me the benefit of their discussion. The removal, though it added greatly to the severity and danger of the operation, did not prevent the patient from making an excellent recovery, and he has many times since spoken to me with the greatest gratitude and thankfulness for the complete relief I had afforded him in every way. In the case, on the other hand, in which I did not remove them they became from first to last a cause of trouble and distress. Soon after the operation they became swollen, and remained tender for a long time; they were there as a possible seat for the return of the disease, and by their physiological action they were a constant source of annoyance." Jacobson says that three patients thus treated by him were most thankful for the result. The consent of the patient, after a plain statement of the advantages of this extra operation, must of course, be obtained.

In every case of cancer of the penis the inguinal, and perhaps the femoral, ganglia should be thoroughly removed, preferably at the time of amputation of the penis, or a little later on if such delay is imperative. The dissection should be thorough and complete, and care should be taken not to wound the femoral vessels, the anterior crural nerve, and the saphena vein.

It is utterly futile to apply ointments or liquids to cancerously enlarged ganglia with a view to produce absorption of the infiltration. Such an attempt entails a waste of precious time.

### Sarcoma of the Penis.

This form of malignant degeneration of the penis is usually secondary to the involvement of other parts; it may, however, be primary. It, as a rule, begins in the tissues of the corpora cavernosa.

A case of primary sarcoma of the glans penis in a boy aged eight is reported by Mr. Hutchinson.<sup>2</sup>

Marcus Beck<sup>3</sup> reported the case of a man aged fifty-three who had

<sup>1</sup> *British Med. Journal*, 1886, vol. i. p. 187.

<sup>2</sup> *Pathological Society's Transactions*, vol. vi. p. 228.

<sup>3</sup> *Ibid.*, vol. xxiv. p. 153.

a fibrous tumor of the penis which was removed, and two years later a new growth appeared in the scar. Nine years later the tumor was as large as a hen's egg and decidedly nodulated.

Other cases have been reported by Mr. Battle, E. H. Fenwick, and Kaufmann. This new growth attacks both young and old, and sometimes seems to follow traumatisms. The clinical features are the slow, and sometimes rapid, development of a tumor without any painful sensations, which enlarges and distorts the penis. After removal there is always great danger of the return of the morbid process.

Secondary sarcomata of the penis are sufficiently common, and they present, in the main, symptoms similar to those of the primary variety.

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## CHAPTER XL.

### ELEPHANTIASIS OF THE GENITALS.

ELEPHANTIASIS of the male and female genitals occurs second in frequency to the same affection of the lower extremities. It occurs in rare and sporadic cases in America, England, and on the continent of Europe, but is quite common and endemic in tropical and subtropical countries. It is frequently seen in Japan, India, and the West Indies, in Central and South America, in Southern and Western Africa, and in the Samoan and Hawaiian Islands.

No better definition of elephantiasis can be given than that of Kaposi,<sup>1</sup> who says: "We use the term elephantiasis Arabum to indicate an hypertrophy of the fibrous tissue of the cutis and of the subcutaneous connective tissue, affecting the latter primarily, and followed in the course of further development by an increase in volume of all locally implicated adjacent organs and tissues, caused by local disturbances of the circulation and chronic recurrent inflammation of the vessels and lymphatics, and confined to isolated regions of the body."

For clinical description it is best to divide elephantiasis of the genitals into the endemic and the sporadic forms. In this country we see nothing of the development of endemic cases, so I, like Kaposi, am forced to take my facts from Pruner,<sup>2</sup> who saw many cases in the East. According to this observer, the disease generally begins as a hard kernel, usually under the skin, at the bottom of the left side of the scrotum. This kernel enlarges in size, and thus the surrounding parts are invaded. As the affection increases the surface of the scrotum becomes thickened and indurated, and is readily pitted on pressure, and it appears furrowed, channelled, wrinkled, and nodular. Pruner says that he never could get a history of erysipelas complicating the onset and development of elephantiasis of the scrotum, though he has seen it

<sup>1</sup> *Diseases of the Skin*, by Hebra and Kaposi, vol. iii., London, 1874, pp. 130 et seq.

<sup>2</sup> *Die Krankheiten des Orients*, Erlangen, 1847.



during the formation of elephantiasis of the prepuce, which is of much less frequent occurrence. As the scrotum becomes large and heavy, it drags down the adjacent skin of the abdomen, which is incorporated into the scrotal mass. In most cases the organ is slowly absorbed into the scrotal mass, till it becomes completely hidden in the tumor. Its cutaneous covering is connected merely to the glans, and forms a blind canal whose aperture is situated in front in the middle line, which forms a kind of outward extension of the urethra. Sometimes a gutter is formed in the scrotal tissue, beginning at the urethral opening and running down to the bottom of the tumor. The skin of this gutter may be converted into mucous membrane. In some cases the tumors have been known to become very large, varying in size and volume until they reached down to the feet. In this condition the patient often carries his genitals before him on a wheelbarrow. Such tumors on removal may weigh from fifty to two hundred pounds and over.

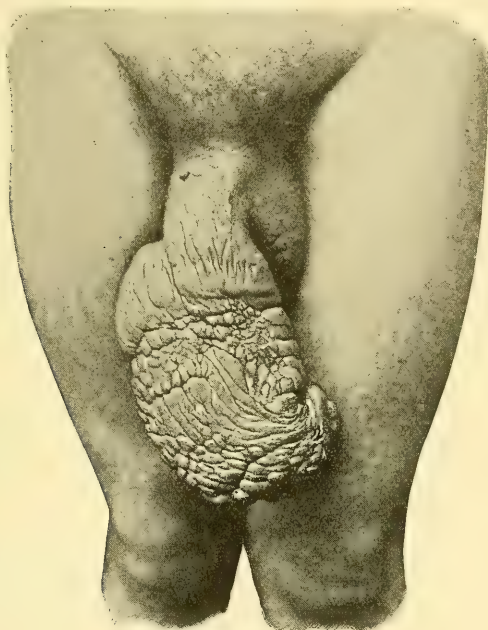
When elephantiasis of the genitals is very much developed, there is frequently observed to ooze from the scrotum a yellowish serous fluid which escapes from the elongated and dilated lymphatics which have become ruptured. This condition is called "lymphorrhœa," and the organ thus affected is termed "lymph-scrotum." This flow of lymph was very active in a case observed by me, which I had the opportunity of carefully studying. In this case the lymph-fluid exuded through little crevices from the interstices of the connective tissue. In most cases, however, according to Kaposi and authorities who have seen the disease in tropical climates, the exudation is from a large surface, very much as we see it in moist eczema. In either case the albuminous fluid forms crusts, under some of which superficial ulceration may occur. It will be remembered that in the endemic form of elephantiasis of the genitals there is in the majority of cases involvement of both penis and scrotum.

I have seen three cases of sporadic elephantiasis of the penis in New York.

An interesting case occurred in the practice of Dr. D. B. Gould, who very kindly allowed me to examine it on several occasions. The patient was a young man twenty-two years old. He had suffered from gonorrhœa, and had used very strong injections, which had given rise to inflammation of the whole penis, the organ being described as much enlarged, red, and painful. This primary hyperæmia slowly subsided, and then the penis began to swell in its preputial portion. This swelling, sometimes accompanied by transient hyperæmia, went on steadily, and in two years produced the deformity seen in Fig. 180. The penis was so elongated that it reached nearly to the knees. Its distal portion was the largest, and its circumference was about ten inches. Near the scrotum the organ was rather more than twice its normal size. The diseased tissue was firm and brawny. Its surface was channelled by numerous furrows running in a longitudinal direction. These furrows were crossed at right angles and more or less obliquely by other furrows, and thus the skin was divided up into lobulations and nodulations which were seated side by side like paving-stones. This tumor was removed, and a very serviceable penis was produced. There was no obstruction to urination in either of these cases.

The third case seen by me was one of elephantiasis beginning in the prepuce, which was much enlarged, so that the penis looked very much like an Indian club. The patient was a young Hebrew, who claimed that his deformity dated from the day when a woman gave his penis a vicious twisting squeeze. The organ swelled, particularly at the line of union formed by circumcision. From this the swelling increased, accompanied at times by transient hyperæmia. I know nothing of the

FIG. 180.



Elephantiasis of the penis.

subsequent course of this case. It is fair to assume that if not operated upon the outcome was the involvement of the entire penis.

Dr. R. F. Weir also reports a strikingly interesting case in a man fifty-nine years old. The patient had had stricture of the urethra in its penile portion, complicated by abscess-formation. This left a fistula from which alone the urine thereafter flowed. Coincidentally with the formation of the abscess the penis began to enlarge, generally painlessly, but sometimes pain was present. The whole organ was much enlarged, and presented the usual appearances of elephantiasis. Voillemier<sup>1</sup> also reported a noteworthy case of elephantiasis of the penis and scrotum in a patient who had always lived in France. The origin of the disease in this case is not known. The patient was an inveterate masturbator.

There are a few similar cases in literature. It thus appears that elephantiasis of the penis alone is very rare, and that there is usually involvement of the penis and scrotum, the disease most frequently beginning in the latter structure, as it did in the case I first alluded to.

<sup>1</sup> *Annales de Derm. et de Syphil.*, vol. v., 1874, No. 1. Voillemier's paper is valuable by reason of the views therein expressed as to the surgery of these tumors.

In the present state of our knowledge it may be said that in sporadic cases of elephantiasis of the penis there is usually a history of some irritative process which antedated the onset of the hypertrophy. In one case herein reported by me injury to the vessels of the groin was the starting-point of the trouble, in another, inflammation of the penis from the imtemperate use of injections, and in the third, direct traumatism. In Weir's case the irritation began in inflammation behind a stricture, which ended in fistula. It may be that the frequent daily acts of self-abuse in Voilemier's case were the starting-point in the development of the disease.

**Treatment.**—In some cases amputation of the penis may be necessary, particularly in those, like Weir's, in which there was a urethral fistula in the body of the penis. In other cases removal of the mass of hypertrophied tissue may be practised, the incisions being made according to the topography of the parts with a view of getting such flaps as will after healing produce a tolerably symmetrical organ. It is the unanimous opinion of operators that even if flaps are taken from the hypertrophied tissue, they do not form the focus of new development.

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## CHAPTER XLI.

### VARICOCELE.

THE term "varicocele" is used to denote a varicose condition of the spermatic veins by which a generalized or localized swelling in the scrotum is produced. It is usually a mild affection, and occurs, on an average, in well-marked form in 10 per cent. of all male subjects. Many men have slight fulness and tortuosity of the spermatic veins who cannot be said to have varicocele.

This affection is, as a rule, developed slowly, insidiously, and usually painlessly. Again, it develops quite rapidly and with much discomfort to the bearer. Bennett,<sup>1</sup> who has written an excellent essay on this subject, says that in nearly 50 per cent. of cases of varicocele the bearers were unaware of its presence until it had been pointed out to them or had been accidentally discovered. In only 20 per cent. of cases were the symptoms at all marked, and in only 25 per cent. did patients seek treatment. It is noted that feeble and neurotic subjects seek relief rather than the robust. In the vast majority of cases varicocele is found only on the left side. Bennett says that in 100 consecutive cases he found it 80 times on the left side, 19 times on both sides, and once only on the right side. He says that in 3 cases, in all, he has seen right-sided varicocele, but admits that his experience is exceptional. Various reasons are given for the constancy of occurrence of varicocele on the left side. The main cause probably lies in the fact that the left spermatic vein empties at right angles into the corresponding renal vein. Further, the

<sup>1</sup> *On Varicocele*, London, 1891.



left spermatic vein may sometimes be pressed upon by the sigmoid flexure distended by fecal accumulation. Whether our modern method of "dressing" has any influence in causing enlargement of the veins of the left side of the scrotum is yet an unsettled question.

There can be no doubt that varicocele is sometimes of congenital origin, though the published cases are as yet small in number. Bennett found in the dissecting-room a tortuous spermatic vein and plexus in a four-year-old boy and in two fetuses—in one abnormality of the veins of the left side, and in the other in the pampiniform plexus. Heredity may also be an underlying cause. There can be no doubt that vessel-tissue may, like other tissues, be transmitted in a condition of vulnerability. Bennett shows that there is frequently found a coexistence of other vascular anomalies with varicocele.

Tumors in the groin, particularly when seated in or near the external ring, are liable to press on these veins and produce varicocele. Various other causes have been thought to induce this condition. For instance, it is stated by some authors that ungratified sexual desire and excessive venery are important factors in its cause. My own opinion is, that as predisposing causes these perhaps may be considered as somewhat influential, since any condition which tends to induce engorgement of the spermatic vessels is of course liable to aggravate this condition and perhaps even to lead to its development. There is no scientific evidence whatever in existence in support of the statement quite frequently made that masturbation causes varicocele. The latter by its irritating influence may lead its bearer to masturbation. I have frequently seen the mild congestion of the spermatic veins of continent young men speedily pass away after marriage. Varicocele very often occasions more or less mental suffering to some patients afflicted with it. Some patients, like many surgeons, regard it as the result of masturbation practised in early years, and fear that it will ultimately lead to impotency, while in others, again, its existence causes the most gloomy thoughts, which sometimes end in well-marked hypochondriasis.

While varicocele may sometimes be found in young boys of twelve to fifteen years, it is mostly seen in adolescents and young men up to thirty years of age.

For lucidity of description the classification of the various forms of varicocele offered by Bennett is to be commended. It is clinically true, according to my observation:

There is, first, the elongated diffused swelling, which extends from the external abdominal ring down to the testicle, which is larger high up than lower down;

The second form is that of a diffuse tumor surrounding the testicle, particularly its upper part, and extending halfway up to the external abdominal ring;

The third form is a goodly-sized tumor just below the external ring and extending halfway down to the testis.

When a varicocele tumor is palpated, a sensation is conveyed to the fingers like that of a mass of earth-worms, and this simile is sometimes rendered all the more striking by the contraction of the cremaster muscle. Very often the scrotum is lax and dependent, and in its walls tortuous, flaccid veins can be distinctly seen. Under the influence of cold the

scrotum and its varicocele contract materially, while heat and excitation tend to produce a marked laxity and elongation of the parts.

The **symptoms** of varicocele depend largely upon the size and condition of the tumor. When it is large, long, and dependent, the patient very often complains of a sensation of weight, dragging, and of mild tension, which may extend to the groin, loins, and even to the lumbar region. All these symptoms may be aggravated by excessive heat and over-exertion. In other cases patients suffer from a dull aching pain, which has periods of intensity and intermission. A crampy pain is sometimes complained of in cases in which the tumor is very large. In all probability this pain is due, as explained by Bennett, to the overburdened condition of the cremaster muscle.

The sharp pain sometimes complained of by subjects of varicocele is, in all probability, due to spasm of the cremaster muscle, associated with intra-abdominal pressure.

Tenderness of the veins and of the cord is a not infrequent symptom, particularly in nervous, neurasthenic, and over-anxious patients. Very often patients themselves produce this symptom by repeated examination and manipulation of their varicocele. Heat, over-exertion, jolting, and bicycling also produce this symptom temporarily. In many cases there are no symptoms whatever.

Varicocele consists in excessive development of the veins, the walls of which become thickened by cell-increase, and are subsequently the seat of fatty change and, in some cases, even of calcareous degeneration. Phleboliths are sometimes found within them, while in general their valves are wholly effaced and their walls much thinned. Certain secondary changes in parts in connection with the spermatic veins often follow varicocele. For instance, under the influence of the presence of the venous tumor the scrotum sometimes becomes more or less redundant and relaxed and its walls are much thinned. In such instances the power of the dartos muscle is more or less impaired. Further, in very chronic cases a softened condition, with perhaps slight atrophy of the testis, is a not uncommon sequela, while early in the course of varicocele it is not unusual to find a slightly congested condition of this organ, due of course to the impediment to the return circulation. As a result of these changes it often happens that ultimately the testicle grows gradually smaller, until in some cases it is reduced to the size of a pea and sometimes it seems wholly absorbed. Hydrocele is another not infrequent complication, but it is always of a subacute character and usually not very extensive. Thrombus of the veins is an occasional complication.

According to Bennett, the normal development of the testis is more or less interfered with in about 70 per cent. of all cases of varicocele. In general, however, I think it may be said that the patient's virility is very exceptionally impaired or destroyed by varicocele. Patients sometimes attribute want of sexual power, due to other causes, to varicocele, and therefore demand relief. So importunate are some of them, and so deaf to reasoning, that the surgeon is forced to perform the operation for its mental effect. This condition of mind is mostly found in men of and beyond forty years of age.

**Diagnosis.**—The diagnosis offers no difficulties whatever, since simple

inspection presents a conspicuous clinical picture, and palpation reveals the worm-like mass within the scrotum. In the horizontal state the blood leaves the spermatic veins or can be readily pushed into the abdominal cavity. If the external abdominal ring is now compressed with the finger-tips and the patient told to stand up, the veins will be felt to be empty; then, withdrawing the pressure of the finger-tip, the sudden filling of the veins can be readily felt. A hernia when reduced may stay up; if it should come down, it forms a cylinder of decided calibre, which gives an entirely different sensation from that offered by veins filling with blood.

**Treatment.**—Much relief can be afforded by the use of cold douches and by attention to the condition of the bowels. Patients in a neurotic or neurasthenic condition should be treated symptomatically. Errors in sexual hygiene should be well looked after and removed, according to the indications in each case. Since physical exhaustion of any kind tends to aggravate varicocele, patients should be put on their guard in this direction. When an operation is not admissible, much comfort is afforded to patients by the use of a nicely-fitting and well-supporting suspensory. The surgeon should take pains to see that the bandage is suited to each case, since discomfort may come to a patient who indiscriminately purchases and wears a suspensory.

The radical cure of varicocele can be effected by a number of surgical procedures, many of which are complicated and attended with difficult after-treatment, and need not be mentioned.

The two operations now mostly employed are Howse's operation for excision and its modification by Bennett. Subcutaneous ligation of the veins is much extolled by my friend, Dr. Keyes, who repudiates the open operation. It certainly has its sphere of usefulness in the milder form of cases. The results of the open operation are conspicuously and uniformly good. The parts are so clearly exposed, the ligatures can be applied with such precision, and there is so much simplicity about the operation that it cannot be commended too highly.

It is necessary to remember that the veins to be excised are those of the pampiniform plexus, which is surrounded by a well-defined connective-tissue sheath. These spermatic veins lie well in front, while the vas deferens with its artery and veins is farther backward and inward in the scrotum. If the testis is carefully pulled downward, the vas is put on the stretch, and it can be easily felt, it being hard and firm like a whip-cord. The vas and the deferential artery and veins should be carefully avoided. Only by gross carelessness will they be included in the ligation of the veins. In that event there may be sloughing of the testicle from want of blood-supply.

*Excision of the Spermatic Veins.*—The patient is properly prepared for the operation and placed under the influence of ether. The hairs of the abdomen and genitals must be thoroughly shaved off, and the parts—the scrotum especially—well washed with soap and water, then with alcohol and ether, and then with bichloride solution (1:2000). An assistant holds the testicle firmly and draws it horizontally downward between the thighs. The parts are then tense, the veins can be distinctly felt, and under them the vas is very perceptible. An incision is then made for an inch and a half in the longitudinal direction, and



over the prominence of the veins. The edges of the wound are then separated by retractors, and the coverings of the cord are carefully dissected until the sheath of the veins comes into view. It presents a shining, whitish-gray color, through which the purple veins are seen. This sheath of the pampiniform plexus, which must not be cut into, is then isolated by the knife, aided by the fingers, and then the ligatures, of good strong silk, are to be applied by means of an eyed probe or aneurysm needle about an inch and a half apart, in which case a longer incision is necessary. The lower ligature is tied first, and then the upper one. The vessels are then cut with scissors about a quarter of an inch from the ligatures. The wound-cavity is then copiously irrigated, and then put on the stretch, so as to bring the two edges of the scrotum in coaptation. This can be done with the fingers or by means of two blunt hooks, one at each end of the wound. Two or three, or perhaps more, catgut sutures are now applied, thus firmly fixing the parts. A small opening in the dependent part of the wound is left for drainage. Usually no drainage-tube is necessary.

Bennett's modification of the foregoing operation is the one I now most commonly employ, since its results are so uniformly satisfactory. I can do no better than quote Mr. Bennett's words. He says: "The precise extent of the varicocele which it is desirable to resect in any given case is best determined by placing the patient in the standing position and roughly estimating with the eye—or, better, by measuring with a tape—the degree of elongation of the cord; for instance, should the testis be three inches lower than normal, then certainly not less than three inches of veins should be included between the two ligatures, as it will be desirable to excise at least two inches and a half." Bennett dissects down to the sheath of the fascia, which he also says should not be opened; then he passes his two ligatures, ties and leaves them quite long. Then he cuts out the segment of the veins included between the ligatures. "The cut ends of the stumps left by the division of the varicocele are then brought together and retained in permanent apposition by knotting the ends of the upper ligature to those of the lower, thus at once raising the testis to about its natural level. The ligature ends are cut off quite short."

Then, after the operation, the wound is dusted with iodoform and bandaged with absorbent cotton and gauze. The first dressing may remain on for several days. Perfect healing usually occurs as early as seven and as late as ten or twelve days; very rarely is it found to be later. At first a callous mass will be felt at the point of juncture of the ends of the veins. This will gradually be absorbed, and in the end a little firm nodule will be felt. It is well to cause the patient to wear a suspensory bandage for a short time after any of the radical operations for varicocele.

*Subcutaneous Ligature.*—It is needless to describe the operations by the use of wire, which sloughs out and leaves the veins occluded, since to-day they are practically obsolete. This method is looked upon by most surgeons as unsatisfactory, particularly by reason of the want of certainty as to just what is ligated, and of the chance that some veins may escape, in which event recrudescence would in all probability occur. On this subject I think that Bennett's contention is forcible. He says:

"Speaking generally of the subcutaneous plan, it seems to me that in the present condition of surgery there is a singular anomaly in performing under cover of the skin—that is to say, out of sight, and therefore necessarily wanting in exactness and certainty—an operation which by the open method may be carried out with absolute precision, with what I believe to be no unavoidable risk, and with greater certainty in result."

Subcutaneous ligation, as proposed by Keyes, is performed with his

FIG. 181.



Varicocele needle.

modification of Reverdin's needles, carrying with it stout twisted Chinese-silk ligatures. The patient should not take an anæsthetic. The parts should be shaved and washed as for the open operation. If the patient loses heart and demands an anæsthetic, the first or upper ligature should be placed *in situ* before he lies down, since by this means there can be no escape of the veins, owing to their becoming empty and collapsed.

The patient then stands up near an operating table or lounge, which may be used in case of his fainting. The upper part of the varicose veins are then carefully separated by the thumb and forefinger of the left hand, which compress the scrotal walls behind them and push the vas deferens back. The needle charged with the silk is then firmly pushed through the scrotal walls, as high up as may be necessary from the shape of the tumor, from before backward, behind the vein, and well in front of the vas deferens. This needle is then left in this position, and a second one transfixes the veins above the globus major in precisely the same way. This needle is also left *in situ*, an inch or two of its point, with the silk in the eye, sticking out of the hole in the posterior wall of the scrotum. The following steps in the operation, as described by Keyes, are adopted by me when performing it. He says: "With a tenaculum the loop of silk is seized posteriorly, and the button of the needle being pressed in the handle, its eye is opened and the loop of silk released. This loop is now pulled through posteriorly until its short end emerges, and then the position is that the scrotum is transfixed from before backward by a disentangled single thread of silk and an uncharged needle. The eye of the needle is now allowed to close, and the needle itself, by widening the scrotum, is pulled forward, but its point is not permitted to emerge at the anterior puncture, while the veins are all allowed to fall away into their natural, original position alongside the vas deferens. Then the point of the needle is again advanced under the dartos and to the outer side of the veins, and cautiously brought up to the point of posterior puncture, out of which the thread of silk protrudes. Here care must be taken not by a diagonal puncture to include any considerable bit of dartos or any cutaneous tissue, and not to transfix the silk, but the point of the needle must be brought out, as accurately as possible, exactly at the point of original posterior puncture, alongside of the silk. The parts are again freely irrigated with bichloride solution, and, the eye of the needle being opened by pressure of the button in the handle, the silk is inserted into the eye, enough slack being left upon the silk to allow

the needle to be easily extracted; and by a sudden, rapid motion the needle, recharged with the silk, is withdrawn through the anterior point of puncture." When this is done the ligatures include the veins, and their ends protrude through the little anterior puncture hole. A little traction is then made on the ligature in order to thoroughly free the veins from any connective-tissue fibres. Then the upper ligature is firmly tied twice and cut off. Slight traction being made upon the scrotum, the ligature disappears within it. Each ligature is thus dealt with. The pain is commonly very severe, particularly on tying the first ligature. Usually the scrotum and testis become somewhat swollen, and thus remain for a few days. There may, however, be little if any reaction. It is best for the patient to remain in bed for a few days, with antiseptic gauze and bandage applied to the testis. Then he may go about for a few hours daily. The parts gradually become less swollen and the pain shortly ceases. Sometimes, however, the parts are painful for several weeks. In the end, a fibrous cord, with two or three (according to the number of ligatures used) little firm nodular swellings, are left in place of the varicose veins.

*Ablation of the Scrotum.*—In former years in cases in which the scrotum was flabby and redundant concomitantly with varicocele, some surgeons attempted to afford relief by the ablation of that portion which was excessive. The drawback to the operation was that in many cases the redundancy of tissue reappeared, as a result of the sagging down of the

FIG. 182.



Lewis's scrotal clamp.

varicose tumor. Owing to the simplicity and success afforded by the open operation ablation of the scrotum is now rarely if at all performed by prominent surgeons. If, however, the operation should be decided upon, it can be performed on general surgical lines, Lewis's varicocele-clamp being used to hold the tissues *in situ* and to guide the line of incision.



## CHAPTER XLII.

## HYDROCELE AND HÆMATOCELE.

**Hydrocele.**

By the term "hydrocele" we understand chronic serous effusion into the cavity of the tunica vaginalis, producing more or less distention of the scrotal sac. It must be remembered that that part of the tunica vaginalis in coaptation with the testis is called the visceral portion, and that the part reflected on the inner side of the scrotal wall is called the parietal portion. Since the anatomical structure of the tunica vaginalis is precisely similar to that of serous membranes, it follows that any pathological processes attacking them are similar. In the course of hydrocele, therefore, there is, as a rule, serous effusion, and besides this there may be fibrinous exudation, parenchymatous thickening, and, as a result of infection, suppuration of the sac. For clearness of description we may divide the various forms of hydrocele as follows: 1, hydrocele of the testis; 2, hydrocele of the cord.

Understanding by the term hydrocele a chronic process in contradistinction to the acute vaginalitis of epididymitis, we find that there are two principal varieties—the congenital and acquired—each of which presents further modifications of the essential process.

Congenital hydrocele is mostly seen in young subjects, and consists in the communication of the tunica vaginalis testis with the peritoneal cavity by means of a crowquill-like or pinhole-like duct or opening. After the descent of the testis from the abdominal cavity into the scrotum there has been failure in the obliteration of the channel of communication between the testicular serous membrane and that of the peritoneal cavity. When this communication exists there is found an effusion in the cavity of the tunica vaginalis which produces a scrotal tumor when the patient stands in the erect position, but in the horizontal position the tumor is effaced, owing to the fluid gravitating back into the peritoneal cavity. As the fluid thus flows backward it is not accompanied by a gurgling noise, such as is produced by the return of the intestine.

The tumor in congenital hydrocele is smooth, transparent, fluctuating, translucent, and extends from the bottom of the scrotum into the inguinal canal. The light test and the hypodermic syringe will give much aid in establishing the diagnosis. Even in the upright position the contents of the tumor may be by pressure forced into the peritoneal cavity, while the testicle remains in the scrotum. Then with the tip of the finger over the inguinal canal, if the pressure is slightly removed the fluid will gravitate, slowly and without sensation to the surgeon, back into the scrotum. An intestine in thus passing down produces decided distention, and its progress can be distinctly felt.

In most cases of congenital hydrocele a firmly-applied truss over the inguinal canal will produce adhesion, after which fluid in the tunica vaginalis will be absorbed in a short time. In case of the failure of the truss the sac can be injected with about fifteen drops of deliquesced car-

bolic acid just at the peno-scrotal junction. As soon as practicable after this injection the pressure of the tumor should be reapplied.

Congenital hydrocele is said to occur in from 4 to 7 per cent. of all cases of hydrocele. Exceptionally this form of hydrocele is bilateral.

The term "simple hydrocele," or hydrocele of adults, is applied to uncomplicated cases of this affection. Hydrocele is most commonly seen in adults and toward middle life. It is also sometimes seen in adolescents. The following table of 1000 cases of hydrocele observed by Martin and reported by Dujat<sup>1</sup> is important as showing the years of life in which the affection was observed:

From 18 to 20 years	41 cases.
" 21 " 25 "	173 "
" 26 " 35 "	473 "
" 36 " 45 "	257 "
" 46 " 59 "	43 "
" 60 " 70 "	13 "
	<hr/> 1000

It will be seen that nearly one-half of all the cases occurred between the twenty-sixth and thirty-fifth years, rather more than a quarter between the thirty-sixth and forty-fifth years, and that after that date it was infrequently found. Hydrocele therefore occurs in the years when the sexual powers are at their best and the testicular circulation is most active, and when individuals are most commonly attacked by gonorrhœa and syphilis and liable to traumatisms of the genitals. Simple hydrocele is, as a rule, unilateral and is exceptionally bilateral. As usually found, the scrotal tumor formed by the hydrocele is pear-shaped (see Fig. 183), with its base at the bottom of the scrotum and its apex directed toward the external abdominal ring. In a goodly number of cases the shape of the tumor is distinctly ovoid, with its long axis directed vertically or perhaps a little forward. Less commonly the tumor is rather roundish in shape. The size of the tumor varies with the amount of effusion, which may be several ounces or even quarts. As a rule, from eight to sixteen ounces of fluid can ordinarily be drawn from cases of hydrocele.

To the eye the scrotal tumor presents a quite characteristic clinical picture. The scrotal wall is very much distended, tense, and usually much thinned, and the scrotal veins are very distinct and usually enlarged. By palpation a very firm (see Fig. 183), resistant, elastic tumor is felt, which may give a sensation of slight fluctuation. In some cases distinct fluctuation may be made out. Pressure does not in any way render the tumor smaller, though the finger-tip can cause a depression for a moment.

In some subjects, particularly fat and flabby ones, the penis is drawn backward, and its tegumentary covering is largely included in the scrotal tumor, which hangs quite saliently between the thighs.

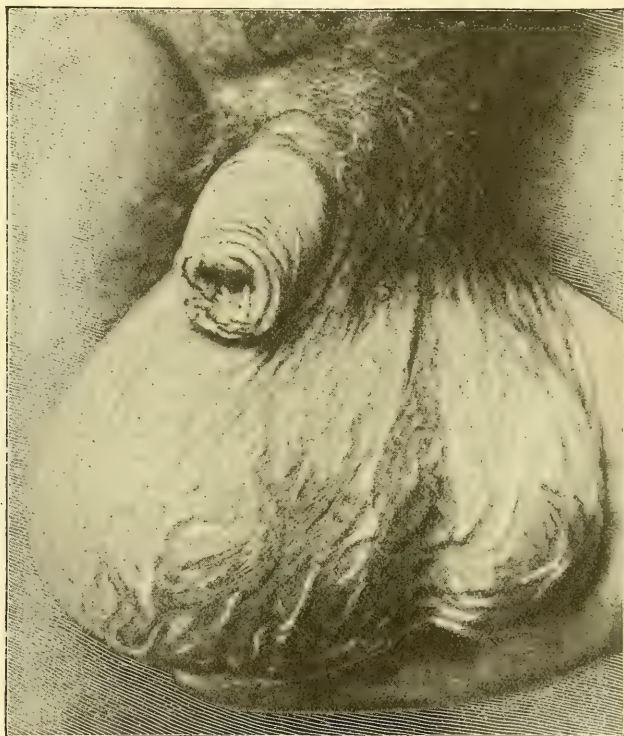
Simple hydrocele is, as a rule, not the seat of pain, and it can be manipulated with impunity except on its posterior and upper surface or that part in which the testis is situated. Pressure here usually causes more or less discomfort, and it is here that patients state that pain exists, either from the pressure of a suspensory or from over-exertion.

The crucial test of hydrocele is its translucency, and this may be deter-

<sup>1</sup> Considerations sur l'Hydrocèle, etc.," *Gaz. méd. de Paris*, 1838, vol. vi. p. 561, quoted by Monod and Terrillon.

mined by what is known as the "light test." The simplest application of this test is as follows: In strong sunlight the patient is made to stand before the surgeon, who sits at his side: he then shades the convexity of the tumor with the outer side of his hand, and examines the organ. In cases where the scrotal wall and the tunica vaginalis are thin and their fluid transparent, translucency can readily be made out. In the absence of sunlight a candle, a gas-light, or the electric light may be used. The light is placed on the opposite side of the scrotum, and the surgeon exam-

FIG. 183.



Hydrocele.

ines the part either by means of a cylinder of paper or by shading his eye with the hand. Distinct translucency is seen in the anterior portion of the tumor, while posteriorly the opaque body of the testis may be detected. This body, when thus inspected, usually looks rather smaller than one expects to find it. In somewhat rare cases we find the testis situated anteriorly and at the upper part of the tumor, the tunica vaginalis being placed posteriorly. Quite exceptionally the testis is at the bottom of the tumor.

In old hydrocele such is the thickness of the sac that the translucency is quite dim. In very dense, thick sacs there is no translucency whatever.

In many cases it is utterly impossible to clearly define the outlines of the testis by palpation. Its position, however, may then be ascertained



by pressure, which, when made on the organ, causes pain or discomfort. When the testis can be made out, it is often impossible to define the outlines of the epididymis, the reason being that with the distention of the tunica vaginalis the parts are so spread out that the epididymis lies flat on the tumor and presents very little if any salience. After the withdrawal of the fluid the testis and epididymis regain their normal relations.

The onset of hydrocele is usually very slow and without any symptoms. Its further course is also slow and insidious, so that, as a rule, the tumor has reached the size of a small pear before its presence is recognized by the patient. In general, Curling's statement that twelve to eighteen months elapse before a hydrocele reaches the external inguinal ring is correct. There are, however, cases in which the development of the tumor is more rapid. On this subject the following table of miscellaneous cases, arranged by Kocher,<sup>1</sup> is interesting, as showing the dates at which patients claimed they came for treatment after the development of the hydroceles:

2 to 3 weeks	in	3 cases.
1 month	"	3 "
2 months	"	2 "
3 "	"	2 "
4 "	"	5 "
5 "	"	3 "
<hr/>		
18 cases.		

In the study of these statistics the inaccuracy of patients' memory and their lack of close and correct observation must be taken into account. It certainly is very rare to find a goodly-sized primary hydrocele develop in three weeks or a month, except in southern countries and in the East. In some very exceptional cases it may refill in that time. The further statistics of the 156 collected cases are more typical of the true course of hydrocele. They are as follows:

$\frac{1}{2}$ to 1 year	in	40 cases.
1 " 2 years	"	34 "
2 " 3 "	"	13 "
3 " 10 "	"	42 "
Later than 10 years	in	9 "
<hr/>		
138 cases.		

It is stated by some authors that spontaneous cure sometimes occurs in hydrocele. Such cases are very rare indeed. In literature we find that Pott claimed that hydrocele disappeared during a violent attack of gout. Behrend and Gillis respectively observed the same phenomenon in the course of small-pox and *la grippe*. It is to be hoped that if in the future cases illustrating this point are published, all the details will be freely given.

The fluid of hydrocele usually has a straw color and is highly albuminous. It has been found of a dark-brown and even black color from admixture with blood. It sometimes contains a small quantity of cholesterolin, and in some few instances spermatozoa have been found in it. In some cases little flakes of albumin are seen floating in the fluid.

Quite exceptionally the fluid of hydrocele looks like milk, from its

<sup>1</sup> *Op. cit.*, p. 76.

admixture with lymph. This condition has received several names, as follows: galactocoele, liporacoele, lymphocoele, chylocoele, and *hydrocele laiteuse* or *graisseuse*. This form of hydrocele is observed in southern countries and in the East Indies. Dr. W. M. Mastin, in an elaborate essay on this subject, reaches the conclusion that the *filaria sanguinis hominis* is the exciting cause of this chylous fluid of hydrocele, and that it reaches the cavity of the tunica vaginalis as a result of rupture of the lymphatic ducts.

Several accidents and complications may occur in the course of hydrocele. Rupture as the result of blows or great pressure may occur and produce much œdema of the scrotum. If careful asepsis is observed, these accidents may not prove very troublesome or dangerous. In some cases a cure has been noted. In others the fluid has been absorbed from the scrotum, and later on the hydrocele reappeared.

Inflammation may attack the walls of the vaginal sac, which is the seat of hydrocele. In all probability this is the result of traumatism. Purulent inflammation of the tunica vaginalis may follow tapping, and there can be no doubt that the trocar in these cases carries the pyogenic microbe into the cavity. In the inflammatory process the walls of the tunica vaginalis may become very much thickened, even to the extent of an inch or more. A number of cases have been reported of old men in whom suppuration of the sac occurred as a complication of hydrocele. It does not, therefore, follow that the accident is peculiar to old men. Without doubt the infecting agent was carried by the trocar or needle. The tissues of old men are more vulnerable than those of young subjects, and suppuration is therefore more promptly produced. Such a hydrocele then becomes nothing less than an abscess-cavity.

As a result of blows or other traumatisms blood may be effused into the vaginal cavity, in which event the hydrocele is transformed into hæmatocele.

#### ENCYSTED HYDROCELE OF THE TESTIS.

There are two varieties of this kind of hydrocele—one arising from the epididymis, and called by some “spermatocele,” and the other from the body of the testicle. Either variety may be complicated by hydrocele of the tunica vaginalis. According to Gosselin, Luschka, and Curling, these cysts are of two kinds—subserous and parenchymatous, or small and large.

The covering or walls of the subserous cysts, which are superficial, are composed simply of stretched serous membrane, while the walls of the parenchymatous, which are developed in the connective tissue, are dense and firm. The subserous cysts are usually multiple, and are found above and around the head of the epididymis; they are generally about the size of a pea. They contain a clear, pellucid fluid, which is sometimes of a milky hue; spermatozoa are never found in the fluid. These cysts sometimes become fused together, and form a single large one having a pedunculated base; they never have any connection with the efferent tubes of the testis, and rarely cause any uneasiness. Occasionally, when very old, these small cysts have such thick walls as to be mistaken for solid tumors.

The large cysts, according to Curling, are usually found “below the

head of the epididymis, close to the anterior extremity of its lower border. They are formed in the connective tissue beneath the investing membrane of the epididymis and in close contact with the efferent tubes." These have received the name of *encysted hydrocele* of the epididymis. The epididymis is flattened and displaced laterally, while the testis is found below, in front of, or at the side of the cyst, very rarely behind it. Mr. Curling gives an illustration of a striking case of this form of cyst, which was distinctly sacculated. The contained fluid is slightly albuminous, colorless, and sometimes contains an abundance of molecules. Curling states that this form of cyst is liable to inflammation, when the fluid becomes albuminous and of a straw color; the cysts may even become lined with a false membrane. Spermatozoa are not infrequently found in the fluid. Regarding the doubtful origin of these bodies, Mr. Paget says "that certain cysts seated near the organ, which naturally secretes the material for semen, may possess the power of secreting a similar fluid." Curling, however, does not accept this view. In his opinion, the thin walls of the sac being in close proximity with the efferent tubes, which are likewise of slight texture, a rupture occurs, allowing the spermatozoa to pass into the cyst. Being merely an accident, he thinks the term *spermatic hydrocele* is improperly applied to this condition.

Cysts springing only from the body of the testis are quite rare. They are due to effusion between the tunica albuginea and the deeper layer of the tunica vaginalis. Occasionally a cyst is seated partly upon the epididymis and partly upon the testicle. The walls of a recent cyst are thin and translucent; as the cyst grows older its walls become thick, dense, and fibrous, sometimes even containing spiculæ of bone and becoming lined with false membrane. The fluid is at first pellucid, but after a time it assumes a yellow or even a deep-brown color.

*Unusual Forms of Hydrocele.*—There are certain anomalous forms of hydrocele which may puzzle the young surgeon.

Rather infrequently we find a scrotal tumor, due to hydrocele, which presents an uneven surface and is more compressible in some parts than others. This condition is due to exudative or adhesive inflammation of the tunica vaginalis, which produces bands of fibrous tissue which divide the cavity up into several compartments. Thus is produced an encysted hydrocele, which may not appear translucent when the light test is applied.

In still rarer instances we find that owing to exudative inflammation more or less of the wall of the tunica vaginalis is thickened, sometimes in a considerable degree. Upon palpation we find an uneven surface, and a marked difference is experienced between the thickened plaque and the balance of the unaltered tunica vaginalis. Then, again, in some cases of great thickening of the walls there are areas of the diameter of half an inch or an inch, in which there is no thickening at all, and on inspection such a membrane presents an appearance similar to windows in a wall.

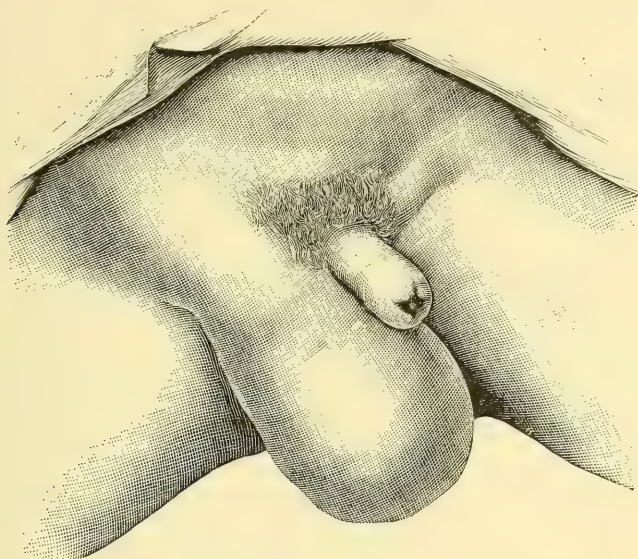
Circumscribed hydrocele is also somewhat rarely found. In these cases a large portion of the two layers of the tunica vaginalis has become adherent, and a dropsy has occurred in a limited portion, which produces a swelling, usually round or oval, which is attached to the testes.

Under the title "*hydrocele bilocularis*," or *hydrocèle en bissac*, a peculiar and rare form of the affection is described. (See Fig. 184.) In



this form the hydrocele tumor is in the scrotum, extends up the inguinal region and through the rings by a narrow neck, and is continuous with another tumor seated within the abdominal cavity and underneath the parietal peritoneum, and entirely independent of it. In this form of hydrocele the vaginal process of the peritoneum has become obliterated within the abdominal cavity, and has probably not undergone obliteration toward the testicle. When the patient stands erect the scrotal tumor is

FIG. 184.



Hydrocele bilocularis.

large and tense, and when in the horizontal position it is more or less flaccid, owing to the gravitation of the fluid into the abdominal cavity. The dimensions of this form of hydrocele are sometimes very great. Rochard reported a case in which the tumor filled part of the abdominal cavity and extended up to the umbilicus and beyond the median line. In a case reported by Bazy<sup>1</sup> these dimensions were exceeded.

Another rare and anomalous form is called "diverticular hydrocele," and by the French *hydrocèle de Béraud*.<sup>2</sup> In this form there are two cavities, the one around the testis, and the other outside of that and communicating with it by means of a small opening or neck. This hydrocele begins as the ordinary form, but, owing to some cause, perhaps localized thinning of the sac-wall, a slight bulging occurs, and soon a diverticulum is formed. This second cavity goes on increasing until it becomes larger than the original sac. The orifice of communication in these cases is about large enough to admit the tip of the fore finger, and by its firm structure it remains permanent. The translucency is marked

<sup>1</sup> Monod and Terrillon, *op. cit.*, pp. 229 et seq.

<sup>2</sup> "Remarques sur l'Anatomie pathologique d'une Forme de l'Hydrocèle," *Arch. gén. de Médecine*, 1856, 5th Series, vol. vii. p. 670.

in this form of hydrocele, owing to the extreme thinness of the walls of the diverticulum.

All forms of hydrocele may be complicated with hernia, which may at first make the diagnosis more difficult.

**Causes of Hydrocele.**—Hydrocele or vaginalitis frequently follows gonorrhœal epididymitis and orchi-epididymitis. Acute hydrocele with a rather limited amount of effusion is a constant concomitant of gonorrhœal testicular inflammation. When hydrocele is of gonorrhœal origin, it is thought by Panas<sup>1</sup> and Vétault<sup>2</sup> to be due to fibrinous effusion into the epididymis by which the efferent vessels are compressed to such a degree as to produce congestion and effusion into the tunica vaginalis. Hydrocele may also result from chronic gonorrhœal orchitis. It is very common to find great vascularity of the visceral layer of the tunica vaginalis when that cavity is opened surgically in cases of chronically inflamed testis with hydrocele following gonorrhœa. In the same class of cases I have seen intense congestion and thickening of the epididymis when operating for hydrocele. My studies, therefore, convince me that chronic inflammation of the epididymis and orchitis with or without epididymitis following gonorrhœa are frequently causative factors in the production of hydrocele.

Hydrocele has been known to follow varicocele, and it is thought by some that the latter condition is sometimes the determining cause of the former.

Hydrocele may occur as a complication of general dropsy, but it is very probable that in that event there was some antecedent testicular injury or disturbance.

Traumatism undoubtedly is a frequent cause of hydrocele. It is so common to find, particularly on the visceral layer of the tunica vaginalis, patches showing antecedent hemorrhage, or of chronic inflammation and cicatrization, that in the absence of a history of gonorrhœa no other cause than injury can be assigned. It is claimed by some that cysts of the epididymis and of Morgagni's hydatid may rupture into the tunica vaginalis, and thus cause irritation, which is followed by hydrocele. This, however, is mere hypothesis.

Inguinal hernia, particularly when voluminous, has been thought to be a cause of hydrocele. On this subject the essay of Bouisson<sup>3</sup> may be of interest. The contention that a diathetic state like gout or rheumatism may, as claimed by Verneuil and Chollet,<sup>4</sup> produce hydrocele, is wholly wanting in scientific proof. Hydrocele undoubtedly results in every case from some definite disturbance of the equilibrium of the circulation, the origin of which is not always apparent. It is safe to say that the disturbance in the circulation exists somewhere in the testicle or the cord, and that hydrocele does not follow, as claimed by some, *per se*, troubles in the bladder and urethra.

**Pathological Anatomy.**—In some recent cases of hydrocele no thickening of the serous membrane can be discovered, and in many it is even thinner than normal, and the most noticeable feature in either case is

<sup>1</sup> "Sur les Causes et la Nature de l'Hydrocèle vaginale simple," *Arch. gén. de Méd.*, 1872, 6th Series, vol. xix. p. 5.

<sup>2</sup> *Considérations étiologiques sur l'Hydrocèle des Adults*, Paris, 1872.

<sup>3</sup> "De l'Hydrocèle causée par une Hernie volumineuse, Hydrocèle de Gibbon," *Montpellier Médical*, Feb., 1867.

<sup>4</sup> "Recherches sur l'Étiologie de l'Hydrocèle," *Thèse de Paris*, 1879.

more or less hyperæmia, the vessels being numerous and prominent. In further advanced cases the membrane is decidedly thickened, of a pearly-white color, and streaked by numerous vessels. This thickening of the membrane may be comparable to that of blotting-paper or it may be still more excessive. In very old hydroceles a thickening of one and two lines, and even more than that, may be found. In many cases of thickening the serous surface is still smooth and glossy. Evidences of fibrinous exudation, local or general, are not uncommonly found. Thus, the membrane may be simply a little rough and more than ordinarily opaque, or it may be covered with little tufts or patches of false membrane. In fact, all the features of exudative and adhesive inflammation of serous membranes may be found in the tunica vaginalis. The endothelium is then thrown off, and the surface of the membrane becomes covered with a membrane of plastic lymph looking sometimes like velvet, again like lace, and sometimes a general nutmeg-grater roughness. As a result of this adhesive inflammation the visceral and parietal layers may be glued together in patches of greater or less size.

Where pus-formation occurs there is always more or less plastic exudation, coexistent with the suppuration. Kocher<sup>1</sup> has elaborated a complex pathological classification of the changes which take place in hydrocele, and has expended upon it a wealth of Latin terms. The essential facts, however, are as they have just been presented.

The **diagnosis** of hydrocele is usually quite easy. Its slow development without symptoms, its beginning at the bottom of the scrotum, its pyriform or oval shape, are presumptive symptoms, while all doubt may be removed by the light test or by slight aspiration with the hypodermic needle. In hydrocele the tumor presents dulness on percussion; there is no impetus on coughing and no change in the tumor when the patient is in the horizontal position. In hernia, particularly incarcerated, the tumor comes usually suddenly from above, where it is largest, and is doughy, and, as a rule, resonant, on percussion.

The translucency of hydrocele always establishes the diagnosis between it and solid tumors of the testes.

**Diagnosis.**—Encysted hydrocele of the epididymis is usually recognized from the position and number of the cysts. In cases of doubt, especially when the cysts are hard and firm, the introduction of a hypodermic needle will determine whether they contain fluid. The difference in shape between these large cysts and hydrocele of the tunica vaginalis is an important point, while the position of the testicle at the bottom of the tumor confirms the suspicion of large encysted hydrocele.

In some cases, however, on account of abnormalities in position, a positive diagnosis can only be made by drawing off some of the fluid, which is generally pellucid or milky rather than straw-colored. Translucency and fluctuation are additional points in the diagnosis.

**Treatment.**—The treatment of hydrocele may be palliative or radical: by the former we merely remove the fluid, by the latter we hope to prevent its re-formation. The seton, acupuncture, and electrolysis in the treatment of hydrocele are now practically obsolete procedures.

For various reasons, many patients prefer to have their hydroceles tapped from time to time, rather than undergo any operation more radical.

<sup>1</sup> *Op. cit.*, pp. 54 et seq.



Tapping of hydrocele is a very simple operation. It is always necessary to wash the scrotal wall with soap and water, and then with bichloride solution (1:1000). The patient stands before the surgeon, who, having ascertained by palpation or the light test the position of the testis, holds the scrotum firm and tense with the left hand. Then he pushes firmly, rather quickly and gently, a fine aseptized trocar upward as well as forward. The insertion should be made in the middle of the most prominent part of the tumor, and care should be taken that veins are avoided. If we aim at a radical cure and a cutting operation is out of the question, we may inject either tincture of iodine or carbolic acid into the sac. For this operation a short glass syringe, holding two or three drachms and attachable by its nozzle to a fine trocar, may be used. If iodine is selected as the agent to produce the hoped-for adhesive inflammation which shall thoroughly agglutinate the two layers of the tunica vaginalis, about two to four drachms of the tincture may be thrown into the vaginal cavity. Care must be taken that the tip of the trocar does not slip out from between the two layers of the tunica vaginalis. After the injection the part should be well kneaded or manipulated, so that the whole of the serous membrane is acted upon. If carbolic acid is selected for use, sixty to ninety drops of the recently-deliquesced acid may be thrown in by means of the syringe. Both of these fluids may be left in the vaginal cavity. This operation should be done at the patient's home or at a hospital. The immediate result may be a slight or a very severe reaction in the shape of heat, swelling, and more or less pain. The patient must be kept in the recumbent position, and cooling lotions or applications may be used to the scrotum. The patient may go about, usually in a few days, but he may be confined at home for a week or more.

In justice to the patient, it is well to make him clearly understand that this injection treatment is not in every case successful. This may be said in spite of the contention of some enthusiasts who claim uniform and invariable cure. Failures after carbolic acid are less frequent than after tincture of iodine, but they will follow in a goodly proportion of cases, no matter how carefully and thoroughly the injection has been made, nor how skilful is the operator. It is needless to mention other agents for injection, since they are, as a rule, inert.

The injection treatment is only applicable to cases of rather recent hydrocele, of not excessive size, and in which the epididymis and testes are healthy. When the tunica vaginalis is much thickened, injections will do harm rather than good.

*Treatment by Incision.*—Volkman proposed a method which is generally productive of cure, the failures amounting to about 2 per cent. His procedure is as follows: The scrotum and pubes are to be shaved and well washed with soap and water, alcohol and ether, and then flushed with a bichloride solution (1:1000). A vertical incision about three inches long is then made over the prominence and just in the middle of the hydrocele. The dissection is slowly made until the brownish or bluish bag of water is visible, all vessels being secured as the operation proceeds. It is well to let out the fluid by a quick stab into the wall with a straight bistoury, and then to complete the two- or three-inch incision with blunt scissors. The cut edges of the tunica vaginalis are then stitched to the edges of the scrotal wound, and the cavity may be stuffed with gauze or

a large drainage-tube may be inserted. The visceral and parietal layers of the tunica vaginalis may be gently swabbed with pure deliquesced carbolic acid just after stitching, since this application may aid in the production of adhesive inflammation. It certainly never does any harm. The parts are to be dusted with iodoform and covered with gauze and a bandage. Renewal of the dressing is necessary every day or two, and the greatest care must be taken that the wound does not become infected. Healing occurs in two to three weeks.

Another procedure which has produced good results in my hands is as follows: The patient being prepared and etherized, the incision as above detailed is made. Then all of the parietal layer of the tunica vaginalis is cut away with the scissors, except what is necessary to cover the testis. The serous surface is then swabbed with pure carbolic acid, and the cut edges of the remains of the parietal tunica are then stitched together with fine catgut, leaving a little opening in the lower part for drainage. A small drainage-tube may be inserted or a few strands of horsehair. The cut edges of the scrotum are treated in a similar manner. The wound is dressed as described in the previous operation. Healing may occur in ten days or two weeks, but sometimes it is delayed a little longer. It is not necessary to renew the dressings so often after this operation.

The most radical operation for hydrocele is that proposed by von Bergmann. In this operation, after the incision into the sac, the tunica vaginalis is peeled and dissected off the scrotum and cord as far as can be reached. It is then cut off as close to the testicle as possible. A drainage-tube is inserted, and the edges of the wound are stitched together with silk. The parts are then dusted with iodoform and well bandaged. Healing occurs in from ten to twenty days, during which the patient remains in bed.

Even after these radical cutting operations relapses may, though quite rarely, occur. The truth is, that we have no absolutely infallible cure for hydrocele. One advantage, often of much importance, attends the cutting operations: it is that we are able to freely examine the testis and the epididymis. After thorough healing of the wound, the testis, as a rule, will not be found adherent or immobile, but, on the contrary, it will float free in the ambient connective tissue.

*Treatment of Encysted Hydrocele.*—The small encysted hydrocele seldom requires any attention unless it tends to increase in size or become painful, when the fluid may be drawn off with a hypodermic needle or by acupuncture. This operation sometimes gives permanent relief, but may need to be repeated. Large cysts should be tapped separately and injected. Sometimes the tapping and injection of a single cyst cause subsidence of all the rest. Although the seton has been used with success, it sometimes causes violent inflammation and abscess. Volkmann's operation may be employed after failure of tapping.

**HYDROCELE OF THE SPERMATIC CORD.**—There are two varieties of hydrocele of the cord, the diffused and the encysted.

The *diffused* form is merely a serous infiltration into the loose and abundant connective tissue of the cord. The first clear description of the lesion was given by Pott: "In general, while it is of moderate size, the state of it is as follows: The scrotal bag is free from all appearances of disease, except that when the skin is not congested it seems rather

fuller, and hangs rather lower on that side than on the other, and, if suspended lightly in the palm of the hand, feels heavier; the testicle with its epididymis is to be felt perfectly distinct below this fulness, neither enlarged nor in any manner altered from its natural state; the spermatic process is considerably larger than it ought to be, and feels like a varix or like an omental hernia, according to the different sizes of the tumor; it has a pyramidal kind of form, broader at the bottom than at the top; by gentle and continued pressure it seems gradually to recede or go up, but drops down again immediately upon removing the pressure, and that as freely in a supine as in an erect posture. It is attended with a very small degree of pain or uneasiness, which uneasiness is not felt where the tumefaction is, but in the loins. If the extravasation be confined to what is called the spermatic process, the opening in the tendon of the abdominal muscle is not at all dilated, and the process passing through it may be very distinctly felt; but if the cellular membrane which invests the spermatic vessels within the abdomen be affected, the tendinous aperture is enlarged, and the increased size of the distended membrane passing through it produces to the touch a sensation not very unlike that of an omental rupture." Curling says that the tumor is at first cylindrical, and becomes pyramidal as it enlarges. The penis in this affection is never retracted, as it may be in vaginal hydrocele.

This form of hydrocele may be mistaken for a hernia. The latter often passes into the abdomen when the patient lies down, while the former is but slightly if at all displaced. The swelling of hydrocele is firmer, though doughy, and fluctuating; a hernia, moreover, unless it be omental, is resonant on percussion. The impulse on coughing in hernia is quite different from the very slight downward movement of the enlarged cord in hydrocele. In hernia the cord can always be traced in normal size from the testis to the ring. Scarpa called attention to the resemblance of this form of hydrocele to an irreducible epiplocele, and to the necessity of caution in operating.

The **treatment** consists in making small punctures at the most dependent part of the tumor, and in subsequently maintaining pressure. Large incisions are unnecessary.

*Encysted* hydrocele of the cord occurs most commonly in infants. It forms slowly and without pain, and may reach the size of an egg before being seen by the surgeon. It is distinctly circumscribed, round or oval, translucent, firmly attached to the spermatic cord, movable upon firm traction, and not involving the overlying skin. It is firm in consistence and but slightly fluctuating.

There is seldom more than one tumor, but we sometimes find a series of tumors extending from the testis to the external abdominal ring. When occurring in infancy the lesion may result from imprisonment of a congenital hydrocele; in adults, however, it originates in the same manner as do the hydroceles of the epididymis. The cyst-wall is usually thin and fibrous, but in chronic cases it becomes very thick and tough. The fluid contents of the cyst are colorless, like water, or viscid and mucoid, and sometimes spermatozoa are found.

These cysts may be seated at any part of the cord; those of the epididymis are sometimes wrongly considered cysts of the cord. When the latter are seated near the external abdominal ring the diagnosis may be



very difficult, otherwise it is generally easy. The character and situation of the tumor and its mobility with the cord and testis are usually distinctive. The danger of mistaking hernia for encysted hydrocele may be avoided by observing the uniform size of the latter, its circumscribed condition, its translucency, and the absence of impulse on coughing and of the gurgling characteristic of rupture.

In children this affection usually disappears spontaneously. The process of absorption may be hastened, if desirable, by counter-irritation with tincture of iodine. Withdrawal of the fluid and subsequent pressure sometimes produce a perfect cure. Acupuncture has been found of service, while incisions and the seton are liable to cause excessive inflammation. In very obstinate cases injection of the tincture of iodine or carbolic acid may be resorted to.

### Hæmatocele.

The term hæmatocele is applied to swellings of the testis or of the cord, caused by effusion of blood. Curling's division of its varieties is the best.

**HÆMATOCELE OF THE TESTIS.**—Hæmatocele of the testis may be either *vaginal*, in which the effusion takes place into the tunica vaginalis, or *encysted*, when blood is effused into cysts of the testis. Either of these forms may have been preceded by hydrocele. Although some authors have doubted the occurrence of vaginal hæmatocele independent of other disease of the parts, others are convinced that it does take place as the result of puncture, blows, or any injury. Under such conditions it may be called *traumatic* hæmatocele in distinction from the *spontaneous* form, which occurs in cases of blood-dyscrasia and vascular degeneration inducing rupture of the vessels.

Traumatic hæmatocele is usually developed very rapidly; the testis becomes enlarged, hard, and painful, and the scrotum may be œdematous or the seat of blood-effusion. There are usually more or less constitutional disturbance and pain from the tension of the parts. The effused blood often acts as a foreign body, causing suppurative inflammation. Again, the blood may coagulate as it does in aneurysm. Thus the course of the affection is sometimes severe, and, on the contrary, when the effusion is moderate very little trouble is experienced.

The development of spontaneous hæmatocele is slow and unattended with severe symptoms.

The shape of the tumor in vaginal hæmatocele is similar to that of vaginal hydrocele, while that of encysted hæmatocele varies, the testicle in the latter being found below the tumor. Translucency is not found in any form of hæmatocele.

The **diagnosis** of traumatic hæmatocele is generally clear, the history of the case and the local condition indicating its nature. The spontaneous variety is often mistaken for a solid tumor, and frequently the diagnosis can be reached only by making an exploratory puncture.

**Treatment.**—The patient must be placed upon his back, the scrotum thoroughly washed, elevated, and bathed with cooling lotions. Free purgation is often beneficial, and anodynes may be required to relieve the pain. In mild cases improvement begins in a few days, and but little

suffering is experienced. In many cases the effusion continues, and the tension must finally be relieved by puncture. The contents of the cavity should be completely drawn off and the scrotum be well suspended. Should the cavity become refilled, the operation must be repeated. In some cases after entire cessation of the inflammation iodine may be injected as in hydrocele. When the clots are very firm, it may be necessary to make a free incision and thoroughly cleanse the cavity of the sac, antiseptic precautions being observed in the operation and in the subsequent treatment. (See operations for hydrocele.)

**HÆMATOCELE OF THE CORD.**—Hæmatocele of the cord is very rare, and may occur in a *diffused* or in an *encysted* form. Our knowledge of this lesion is largely due to the observations of Mr. Pott.

Diffused hæmatocele occurs quite suddenly from rupture of a spermatic vein during violent exertion, as in lifting a heavy weight, or in consequence of a blow on the parts or during the act of copulation (Maunder). The swelling is usually cylindrical, extending from the upper part of the scrotum to the external ring, and may attain very large proportions. The parts lying over the tumor are unaffected unless the lesion is a result of contusion.

The **symptoms** are sometimes slight and sometimes severe. On palpation the tumor is found to be firm, but doughy, with ill-defined outlines. The course of diffused hæmatocele of the cord is, under favorable circumstances, toward gradual subsidence; in some instances severe inflammatory action is set up. Ultimately the cord is left in a normal condition or perhaps a little thickened.

The **diagnosis** of this affection usually offers no difficulty. The history, position, and general features of the swelling are unmistakable. An important point is the absence of impulse on coughing.

Encysted hæmatocele of the cord is very rare, and is due to effusion of blood into a cyst in consequence of injury.

**Treatment.**—The first indications are to prevent inflammation by the use of the ordinary methods. Subsequently puncture followed by pressure will effect a cure.

## PART II.

# THE CHANCROID OR SOFT CHANCER.

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### CHAPTER XLIII.

#### NATURE OF THE CHANCROID.

SUCH is the general acceptance of the term "chancroid" or "soft chancre" in this country, in contradistinction to the hard chancre or initial lesion of syphilis, that it is well to retain it. It is also known as the simple and the non-infecting chancre, the local contagious ulcer of the genitals, chancre mulet, chancre mou, ulcus molle, as chancrelle by Diday and his followers, and as chancre by the Germans.

While matter enough to make volumes has been written upon chancroid in the past, to-day clear and intelligible ideas may be given in sentences where pages were formerly required. There is no more striking illustration in medicine than is offered in the history of chancroid of diffuseness and uncertainty of statement when the disease was largely the subject of speculation and theory, and of terseness and lucidity when simple, plain facts regarding it, unbiassed and unobscured by theory, are given. To-day the history of chancroid may be amply given in a modest pamphlet, while years ago a portly volume was necessary.

Within the past fifteen years more particularly, and dating back as far as twenty-five years, observations and experiments by various authorities have been made with a view of determining the nature of the chancroid. Slowly and surely have facts accumulated, so that to-day among progressive syphilographers the view that the chancroidal ulcer is due to a distinct virus is generally given up. (See the Introductory chapter.)

Next to Bassereau's era of light, that which was inaugurated in 1876, in which Dr. Bumstead<sup>1</sup> and myself claimed (I state the fact with all modesty) that there was then sufficient proof that the chancroid is not due to a distinct poison or virus, and that it may be developed under certain circumstances *de novo*, is in my judgment the most important in the history of syphilography. From that eventful day in which, at the International Medical Congress, Dr. Bumstead's paper was read with my corroborative results, reached independently of him, and when no other person assented to the view, which by all present was regarded as false and almost sacrilegious, the more enlightened view of the nature of the chancroid has gradually gained ground. We

<sup>1</sup> "The Virus of Venereal Sores, its unity or duality," *Transactions of the International Medical Congress* (1876), Philadelphia, 1877, pp. 708 et seq.



felt that a false doctrine like the following, which is presented by an American author, should, if possible, be demolished: "Chancroid is an affection perpetuated only by contagion; sexual intercourse is not essential. Whenever upon the human body a chancroid is found, there has been deposited pus from another chancroid under conditions favorable to its absorption. No amount of sexual excess, no degree of uncleanness, no irritation, traumatic or chemical, however prolonged, no simple or poisonous ulceration from other specific sources (syphilis, cancer, glanders, etc.),—nothing, in short, can produce chancroids except chancroid (chancroidal bubo included). So that, as Fournier puts it, if all patients in the world with chancroid would avoid contact with others until their malady got well, the disease would cease from off the face of the earth." The fallacy of these sweeping assertions has already been brought out in the Introduction.

The chancroid is a local contagious ulcer of the genitals, inflammatory in its nature and very destructive in its course. It never under any circumstances leads to syphilis nor any form of systemic infection. Its action is purely local to the parts upon which it develops and to the lymphatic vessels and ganglia in immediate anatomical association with those parts. Under certain circumstances chancroid becomes serpiginous, creeping from its original focus and attacking and destroying parts beyond, or, beginning in a chancroid bubo, it runs a chronic, deeply destructive course over the pudenda, thighs, and abdominal walls, and in very severe cases ends in death. Like gonorrhœa, chancroid is in very many cases, particularly among the lower, ignorant, and uncleanly classes, an essentially venereal disease, having its origin in sexual contact and its lesions being sharply limited to the genitalia. The vehicle of contagion of the chancroid in clinical practice is the secretion of a chancroid, of chancroidal lymphangitis, of a chancroidal bubo, or of a serpiginous chancroidal ulcer. Besides these secretions, inflammatory pus and pus resulting from active irritation of syphilitic lesions are also capable of producing chancroidal ulcers *de novo*, the person from whom the contagion is derived being perhaps free from actual chancroids at the time.

Inoculation-experiments have shown that the contagious property of chancroidal pus is contained in the corpuscles, since its filtered serum has been found to produce no reaction upon the tissues. Upon this fact the hypothesis has been based that chancroid remains a local disease, for the reason that its pus-cells are confined to the nearest lymphatic ganglia and do not enter the circulation. This may be taken as a fair specimen of the indiscriminate generalizations which have been indulged in regarding these ulcers.

A marked peculiarity of the chancroid is its amenability to reproduction upon its bearer. This may be demonstrated by experimental inoculations by means of minute superficial incisions or abrasions, and is very commonly seen in auto-inoculations, particularly in women. Our knowledge of the inoculative power of the chancroid, and of the varying vulnerability of the skin thereto, largely depends upon the experience of those who years ago practised syphilization for the cure of syphilis, using therefor chancroidal pus and pus derived from irritated syphilitic lesions. It was proved that these forms of pus produced

ulcers having all the characteristics of chancroids in a long series, but that in time their power seemed to wane, since only aborted pustules were produced. The natural inference from the facts as observed was that auto-inoculations with chancroidal pus gradually decreased in activity with the increased repetition of the process.

This decrease in the activity of the ulcerations on the skin is essentially due to the waning power and final decadence of the pus-microbes. In mucous membranes, however, the succulence and vascularity of the tissues seem to stimulate the vitality of the micro-organisms, and in these structures they luxuriate for longer periods. As a rule, tissues chronically affected by chancroidal ulceration become more and more immune to its action, and are less and less affected by the destructive process.

After a period of quiescence tissues which had failed to respond to the irritant action again became susceptible to the influence of chancrous pus. The practical application of this fact is that a man or woman may have an indefinite number of chancroids during life.

Various statements have been made as to the durability of chancroidal pus when transferred from the body. Thus, Ricord says that he kept it in sealed tubes for seventeen days, and then found it active, and Sperino claims that by means of a lancet upon which this secretion had dried seven months later he produced chancroids. The late Prof. Boeck of Christiania, whose experience in chancroidal inoculations was greater than that of any man before or since his day, assured me that chancroidal pus lost its irritant qualities in a few days after drying; and I personally saw my late colleague, Dr. Bumstead, fail at Charity Hospital to make successful inoculations with chancroidal pus which had been dried on glass slips for twenty-four hours. These facts would seem to indicate that the micro-organisms of chancroid only have a feeble vitality when removed from the human body.

When greatly diluted in water this form of pus loses its power, which is probably destroyed in any menstruum in which its corpuscles become disintegrated.

According to general testimony, chancroidal ulcers may be transmitted by inoculation to the lower animals. This fact, first evolved during the period of obscurity of the chancroid, and made much of by the dualists in their arguments, is pertinent in emphasizing the point of difference between it and syphilis, which is not communicable to animals, but, in the present status of this question, it is no longer essential or of any practical value.

**Modes of Contagion.**—Chancroidal contagion takes place most commonly, in the lower classes, by actual contact, the pus being transferred from one person to another in the act of coitus or in some other intimate mode of direct transfer. This method is called "direct contagion." What is known as "mediate contagion," in which the secretion is transferred by means of the fingers, by towels, utensils, and instruments, may also occur, but much less frequently.

It is probable that chancroidal inoculation in sexual intercourse in many instances takes place by means of more or less well-marked erosions, abrasions, tears, and rents in the mucous membrane, and even on the surface of herpetic vesicles. It is also fair to assume that the

balano-preputial mucous membrane, with its delicate epithelium and its rich and very superficial capillary system, especially as it is subject to the heat, moisture, and maceration incident to the nature and structure of the parts, may be eroded by the irritating pus and become the seat of chancroids. Clinical observation certainly warrants the view that this secretion may lodge in the ducts of the sebaceous follicles of the integument of the penis, and there produce ulceration. The impunity with which surgeons whose fingers are intact handle chancroids and their sequelæ proves that the epidermis of the skin is to an extent impervious to the action of its pus. It is important to remember, however, that we frequently see on uncleanly patients chancroidal pus escape from the genitals and remain a more or less long time upon the integument, and there produce typical ulcers in the hair-follicles. In this case also it is fair to assume that contagion has taken place through the irritant action of the pus in the follicular openings. It is also certain that prolonged lodgement of chancroidal pus upon the fingers, particularly in the region of the sulcus of the nail, may be followed by ulceration.

While in syphilis mediate contagion is very common, in chancroid it is quite rare. Instances in which patients have developed chancroids by means of their fingers or nails to other portions of the body through scratching or other modes of transference have occurred in my experience as well as in that of others. I have also seen chancroidal contagion result from the carelessness of a surgeon in the operation of circumcision, and a simple bubo converted into one of the chancroidal variety by the surgeon operating upon it without having cleaned his bistoury with which he had just incised a chancroidal bubo.

Chancroidal pus smeared upon a water-closet seat may possibly be transferred to the genitalia or perigenital region of another, though I have never seen or heard of such an accident.

Occasionally we see men suffering from chancroid who have cohabited with women upon whose genitals no ulceration can be discovered; and the explanation of the case formerly very generally accepted was that in the vagina chancroidal pus had been deposited by one man and taken up in coitus by a second one, who became contaminated, while the woman thus freed from the pus escaped. The case related by Ricord in which during a husband's short absence his friend, suffering from chancroids, had connection with his wife, who shortly after cohabited with her husband, who contracted chancroids, while she escaped, is so full in detail as to be convincing. As confirmatory of this coincidence the case of Puche is interesting. A man on his wedding-day had coitus with a woman suffering from chancroid, and later on with his wife. Having neglected washing his long foreskin after the impure coitus, the chancroidal pus was transferred to his wife's genitals, and she contracted chancroids, while he escaped. Further, the possibility that the vagina may thus be the means of mediate contagion, the woman escaping, has been very clearly proved by the experiments of Cullerier and Tarnowsky. These observers deposited chancroidal pus in the vaginæ of several women and allowed it to remain there for a period of less than an hour before it was washed away. None of these women contracted chancroids. They made inoculations on the integument with this pus in order to determine its activity, and were



successful. The practical inference from the fact is that the epithelial lining of the vagina, being quite thick and horny, is resistant to the action of chancroidal pus, and that if removed within a few hours, either by the friction of coitus or by irrigation, contagion will not take place.

**Frequency.**—The collated experience of those who see large numbers of cases of venereal diseases goes to prove that the frequency of occurrence of chancroid is largely dependent upon the class of cases observed. Years ago I examined at short intervals large numbers of *puellæ publicæ* in our down-town wards, and among them found many cases of chancroid, while in a more select grade of the profession up town, where I also had opportunities of examination, I found a large proportion of hard chancres and few chancroids. In like manner, at Charity Hospital I have seen more chancroids than hard chancres, while in private practice the reverse obtains. This experience is in direct accord with that of Fournier, who says "that the simple chancre, which is common in the lower classes, becomes rarer and rarer relatively to the syphilitic chancre in proportion as we rise in the social scale." Fournier explains this condition by assuming that men of the lower classes mostly cohabit with old prostitutes long ago syphilitic, and then only subject to chancroid, while among the upper classes younger women, who are just acquiring or have just acquired their experience in syphilis, are the ones in demand.

When we come to consider farther on the origin of the chancroid, we shall find that it is derived, not only from actual lesions, but also from inflammatory pus in syphilitic and non-syphilitic subjects; and it will be shown that the matter of cleanliness plays a most important part in its propagation.

Mauriac<sup>1</sup> has shown that in Paris during the reign of the Commune the ratio of chancroids was much increased, and that in the years succeeding the Franco-Prussian War it was much diminished. The logical explanation of this is that during the unbridled license of the Commune vice and uncleanness went hand in hand, but later on, when law and order prevailed, a more moral and sanitary status existed. Thus, during the past twenty years I have seen in dispensary and in hospital practice what we may term little epidemics of chancroid follow the influx of foreign immigrants, particularly Italians and Hungarians.

In the light of our present knowledge it may be positively affirmed that chancroid is not caused by a distinct specific virus, as was formerly so truculently claimed.

The basis of our knowledge of the nature of the chancroidal ulcer has already been fully detailed in the Introductory chapter. It is there shown that it does not have a special specific virus, and that the ulcer may be readily generated *de novo* at the will of the experimenter from various and the most varied sources. Observation and investigation have shown that while the chancroid may be—and very commonly is—derived from a previous chancre, a chancroidal bubo, or chancroidal lymphangitis, it may also originate in the pus derived from irritated lesions of syphilis and from irritated simple lesions in syphilitic subjects, and also in simple pus, particularly when originating in active or intensely irritated lesions.

<sup>1</sup> *Rareté actuelle du Chancre simple*, Paris, 1876.

## CHAPTER XLIV.

## ETIOLOGY OF THE CHANCROID AS OBSERVED IN CLINICAL PRACTICE.

IN the older works the origin of chancroid is always associated with sexual contact, and nothing is said of the development of the disease *de novo*. The truth is, that clinical observers were held in thrall by the doctrine of the absolute specificity of the chancroid, and they undoubtedly failed to rightly interpret cases in which men presented true chancroids, yet who had not been infected in the sexual act.

In very many cases, undoubtedly, chancroids are derived during sexual intercourse, one party being affected with this active form of ulceration. This form of transmission of the disease is well and generally known. It is transmission by direct descent. But it must be clearly understood that chancroids may be found on the penis of a man, and that examination of the woman with whom he cohabited may show her to be free from these lesions. In other words, it is not safe to say to a man suffering from chancroids that the woman with whom he cohabited undoubtedly had chancroids. This point is strikingly brought out by the case of a young man free from all disease who, after prolonged embraces, with much alcoholic stimulation, with his mistress, was attacked by several preputial chancroids. The woman, otherwise healthy, had just recovered from peritonitis, and had an ulcerated fissure of the os uteri, which gave forth much pus. In this case a discharge that had previously come from a subacute form of inflammation was, in consequence of the peritonitis and excess, transformed into a more active form of pus. Every source of error in this case was carefully eliminated.

This and many similar cases have convinced me beyond all doubt that many cases of chancroid are developed through non-syphilitic women in whom, owing to various causes, an exacerbation has taken place in some lesion of the genitals that previously was innocuous, and which then gave forth an active form of pus. It follows, therefore, that we should be guarded in the cases of suspected wives and mistresses as to what we say to husbands or lovers that are unlucky enough to become affected with ulcers of the genitals in intercourse with the former. Otherwise much harm may be done and innocent women may be cruelly wronged.

It is far from uncommon to observe chancroids in a man contracted in intercourse with a syphilitic woman who has no specific lesion of the genitals, but who suffers from a purulent vaginal secretion. In these cases the simple inflammation of the syphilitic woman gives issue to pus rich in pyogenic microbes. This, again, is an illustration of the statement that men may gain chancroids from women whose genitals are free from these lesions. I have many times, by means of confrontations, conclusively convinced myself of this mode of origin of chancroids.

Then, again, I have seen many instances, in the lower class of patients, in which men have cohabited with impunity with women the victims of an old and extinct syphilis, but who suffered from chronic

chancroids. In these cases the ulcers had become old and inactive, and they had ceased to secrete a dangerous pus.

Now, then, I come to a portion of this subject concerning which there is a widespread want of knowledge in the minds of medical men.

Chancroid being classed as a venereal disease, the physician instinctively thinks that a given ulcer that is presented to him must of necessity have originated in sexual contact. In many cases this supposition is not correct, for chancroids may, as we have seen, originate in some subjects *de novo*. In other words, it is not very uncommon to see chancroids in men who have had no sexual exposure whatever, such lesions being perhaps due to some inherent peculiarities of their tissues, to some diathetic condition or to debility, or to some contamination with particles of dirt that have lodged upon their genital organ. This mode of origin of the chancroid has been conclusively demonstrated to me by very many cases in which herpetic lesions became transformed into actively destructive chancroids. Such cases are far from rare, and if the practitioner will carefully interrogate the patients that come to him suffering from chancroids, he will in many instances find that there has been no exposure within the time required for the development of these lesions, and he will convince himself beyond all doubt that the ulcerative lesions are due to some unknown source of contamination of herpetic vesicles, of chafes, abrasions, or fissures. I have among my notes many cases illustrating the origin of chancroid in all of these lesions and traumatisms. The chancroid in these cases is simply an evidence of wound-infection, and is really a septic ulcer.

Many years ago, when the doctrine prevailed that a man or woman having upon his or her genitals or elsewhere a chancroid must of necessity have contracted that ulcer from some other person afflicted with chancroid, a gentleman, aged twenty-nine, came to me whose case and history much puzzled me. He had had gonorrhœa several times, but had never been infected with syphilis. He was fat and plethoric, and claimed that he had never been sick for a day in his life (suffering from clap excepted). He showed on the inner side of the prepuce a lesion one-third of an inch in diameter that without hesitation I pronounced to be a chancroid. The soft, yellowish, worm-eaten surface and base, the undermined edges, the peculiar secretion, and the halo of inflammatory redness produced a picture so characteristic and typical that my assertion was emphatic. But the gentleman insisted that he had not had any intercourse for a month, and that he had been informed that chancroids appeared within a very few days after coitus. My reply was that he had a chancroid, and that in some unexplained manner he had been contaminated with chancroidal pus. He claimed that this was impossible, and said that under similar circumstances he had had precisely similar ulcers, which, by a number of eminent surgeons and syphilographers in some of the largest cities of America and Europe had in each instance been unqualifiedly pronounced to be chancroids. For a number of years this man came to me with these ulcers. In some instances they appeared so soon after coitus that chancroidal infection seemed probable as a cause, while in others no sexual intercourse had been indulged in for several weeks prior to their appearance. Repeated careful questioning convinced me that this gentleman was the victim of persistently recurring herpes pro-



genitalis, and for a long time it was a mystery to me why in some instances the vesicles dried and their surfaces healed promptly, and in others they became transformed into unhealthy ulcers that could not be distinguished from classical chancroids.

Whether in this case there was a tissue-peculiarity I am unable to say. The patient was seemingly in robust health, yet it seemed to be his lot to suffer (as I know now) from the ravages of pyogenic microbes which, in some unexplained manner, so persistently attacked his excoriated vesicles.

The following case is even more remarkable and worthy of study: A gentleman, thirty years old, thin and rather pale, but who had never had any serious sickness, has suffered from herpes progenitalis three or four times a year for about ten years. He had severe attacks of gonorrhœa in his twenty-fourth and twenty-sixth years. He had never had syphilis. He came under my observation in 1886, having a deep sloughing ulcer in the left groin and a similar ulcer on the thigh just below the groin. These lesions were the sequelæ of two virulent buboes. On the anterior surface of the corresponding thigh were three little ulcers, in all respects like chancroids, and several hair-follicles were the seat of a deep hyperæmia. According to the patient's statement, the lesions upon the thigh were caused by the matter that had escaped from the buboes, he in travelling being unable to dress his ulcers or keep himself clean. As the case is thus far reported it would pass for a well-marked illustration of virulent buboes, complicated by the chancroidal ulcers of the thigh, which were produced by accidental auto-inoculation.

Let us now consider the history of the case. The patient was a very intelligent and scrupulously clean man, who, by reading and from conversation with medical men, had gained a good general idea of chancre and its consequences, and of chancroid and its sequelæ. His account of his case was as follows: He had, as stated, for a number of years been much troubled with herpes progenitalis, which appeared before he had suffered from gonorrhœa. Each attack came on with smarting, burning pain. In some instances the vesicles were seated on the skin of the penis, in others on the inner surface of the prepuce, and in others, again, near the frænum and the meatus urinarius. In the early attacks the vesicles, under simple treatment, healed in about a week. As years went on he observed that sometimes the vesicles assumed an unhealthy appearance, became much ulcerated, and were very rebellious to careful treatment. Being observant as to the results of coitus, he convinced himself that his attacks of herpes were never the effects of that act, and that in none of his sexual contacts had he been the victim of infection. The facts concerning what took place prior to this development of the virulent buboes already spoken of are these: The patient had not had sexual intercourse for three months, and was suddenly attacked with a crop of herpetic vesicles seated in the left fossa of the frænum, which rapidly developed into a large ulcer, which a surgeon pronounced to be a chancroid, and which he maintained could only have been contracted in coitus. This ulcer gave rise to the virulent process in the groin and thigh which eventuated in the buboes and the chancroids.

Here, then, was a case in which an undoubted history of herpes preputialis was given, in which infection in sexual intercourse was entirely out of the question, but in which the vesicles, from some unknown cause,

became transformed into an ulcer typically chancroidal in appearance, which was followed by suppurating buboes.

In 1890 this gentleman came to me again under the following circumstances: Three weeks previously, not having had coitus in four months, he had again been attacked with perputial herpes near the right of the frænum. Being deeply engrossed in business, he contented himself with washing the parts and applying a mild lotion on cotton. The vesicles developed into a typical chancroidal ulcer, and the ganglia in the right groin became swollen and painful and went on to suppuration.

It may be that this gentleman's tissues afforded an especially good culture-ground for pyogenic microbes, for his lesions were certainly very active and destructive, considering that he did not suffer from syphilis.

It is very important to understand the relation of an active syphilitic infection to excoriations, chafes, abrasions, and fissures about the genitals, male and female. In the first and second years of syphilis more especially, and in some instances at later periods, we find that in many cases the simple lesions just enumerated become transformed into ulcers having every feature and characteristic peculiar to chancroids. Cases presenting these features are frequently very puzzling, and it is important that their nature should be clearly understood.

The citation of a case is therefore warrantable: A gentleman, aged twenty-eight, had been syphilitic less than a year, and, though commenced rather late, specific treatment was doing well for him. He presented four typical chancroids on the inner aspect of the prepuce, which appeared twelve days after intercourse with a woman who, under examination, was found to have a simple leucorrhœa. The gentleman had for years, at irregular intervals, suffered from herpes progenitalis, which had always healed promptly under simple treatment. He was therefore much impressed with the fact that in two such attacks which occurred since his infection with syphilis the excoriations had developed into unhealthy-looking and destructive ulcers, which were difficult to cure.

In this case we find a condition very frequently observed in syphilitics. Simple inflammatory lesions of the genitals become converted into typical chancroids—or, as we may say, wound-infections or septic ulcers—undoubtedly as the result of contamination with pyogenic microbes, the source of which is a mystery. Lesions thus produced often display great virulence in consequence of the activity of the local infective process (*staphylococcus* and *streptococcus* infection), which seems to reach its acme in syphilitic tissues, particularly when the infection is not very old. Pus taken from these chancroids in syphilitic subjects will, as a rule, be seen to possess great potentiality in the extent and persistence of the ulcers and in the power that it possesses of producing by inoculation similar lesions for many generations.

In some of these cases of chancreoid that develop *de novo* in syphilitic subjects contamination of the inguinal ganglia takes place by direct lymphatic absorption. As a result we have two forms of bubo—the irritative, which may be aborted; and the inflammatory, which leads to abscess. It is very probable that in the tissues of syphilitic subjects the pyogenic microbes find a most favorable nidus. The inflammatory process to which they give rise is often very active, and the resulting pus, rich in microbes and their poisons or tissue-products, is very virulent and destruc-

tive. Observation during a long period of years has convinced me that chancroids derived from syphilitic pus (the diathesis being quite active) are commonly more destructive than their congeners that are caused by the various forms of simple pus.

It is well to emphasize the fact that in old syphilitics, male and female, in whom the diathesis has seemingly run itself out, lesions of continuity about the genitals are liable to assume the features and characteristics of chancroids. A recollection of this fact will often render an obscure case clear.

It now only remains to speak briefly of the influence of syphilis in producing chancroids in women. The tissues of the genitals of syphilitic women, like those of men similarly afflicted, are liable to the development of chancroidal ulcers *de novo* upon all forms of lesion of continuity, such as herpetic vesicles, abrasions, chafes, etc. In proportion as the disease is active and the general nutrition is lowered these ulcers will be found to be more active and destructive—in short, more typically chancroidal. I will briefly report two cases as illustrative of this statement:

1. A young woman of flabby build, syphilitic a year, in consequence of vulvar pruritus following menstruation scratched the surface of the right protruding nympha until it was raw. She had absolutely refrained from coitus for a month, and had not been near any one suffering from chancroids. Ten days after this paroxysm of scratching I saw her with a large typical chancroid upon the wounded nympha, and a bubo that, when opened a week later, presented every evidence of destructive action.

2. A young woman, fifteen months syphilitic, treated irregularly, noticed a group of herpetic vesicles to the right of the clitoris. She had had similar lesions in years gone by. She had not indulged in sexual intercourse for several months. This group of vesicles promptly became transformed into a typical chancroid as large as a ten-cent piece. Very shortly pain in the right groin pointed to ganglionic contamination, and later on I opened a typical bubo.

In the light of what has already been said in the Introduction as to the development of chancroids in syphilitic subjects I need make no further comment on these cases, for they are simply illustrations of wound-infection. They speak for themselves, and I can vouch for the correctness of the facts. Any physician who sees many cases of venereal disease will certainly call to mind similar ones, some of which may have been obscure to him.

In old prostitutes, the subjects of ancient and perhaps extinct syphilis, we find chronic chancroids that linger in an indolent and aphlegmasic condition for years and years, frequently giving their bearers very little concern, but presenting great rebelliousness to treatment. They are relics of active ulceration, and it is probable that the microbes which have caused them have become weak and attenuated, and hence are powerless for active invasion.

In this clinical summary I have endeavored to present a general outline of the mode and peculiarities of development of chancroids appearing after sexual contact, and *de novo* without sexual contact, and also by accidental pus-contamination. The subject has occupied my mind for many years, and I believe that it is here presented in an accurate manner. I think that I have adduced evidence which proves beyond controversy that



the assertions that a chancroid is always of necessity the result of chancroidal pus, and that if all the patients in the world suffering with chancroid would avoid contact with others until their malady got well the disease would cease from off the face of the earth, are utterly false, and not at all in keeping with the present condition of our knowledge.

To sum up: What we call chancroid is the product of many varieties of pus derived from non-syphilitic and syphilitic subjects. It is therefore a hybrid, heterogeneous lesion, in all cases a septic ulcer, and in many instances simply an active form of wound-infection. This septic ulcer in some cases originates *de novo* from the contact of pyogenic microbes with a raw surface, herpetic or eczematous excoriation, a chafe, etc., sexual contact then having nothing to do with its development. As a general rule, this local infective process is more active in syphilitic than in non-syphilitic subjects. It follows, therefore, that so long as pyogenic microbes and tissue-predisposition exist chancroids will be found upon the mucous membranes and integument of the human race.

## CHAPTER XLV.

### BACTERIOLOGY OF THE CHANCROID.

WITHIN the past ten years several observers have endeavored to prove that in the chancroidal pus and in mucous membranes the seat of chancroidal ulcerations they have found a specific micro-organism.

Ferrari,<sup>1</sup> Mannino,<sup>2</sup> and De Luca<sup>3</sup> each described a micro-organism which they thought was the virus animatum of chancroid, but their descriptions and observations were faulty and lacking in many essential particulars, so they failed to carry conviction to the medical mind.

The essay which has carried the most weight in this question is that of Ducrey,<sup>4</sup> who has constantly found a microbe in chancroidal pus. This observer failed in his efforts to cultivate this microbe, but he noticed that in a series of inoculations on the human subject many microbes gradually disappeared, but this particular one remained constant and abundant in the pus and retained its virulent action. Consequently, he claims that this is the pathogenic agent in soft chancre.

These observations and conclusions of Ducrey have been confirmed by

<sup>1</sup> "La Pathologia dell' Adenite ulcerosa," *Gazz. degli Ospitali*, June, 1885.

<sup>2</sup> "Nouvelles Recherches sur la Pathogénie du Bubou qui accompagne le Chancre mou," *Annales de Derm. et de Syph.*, 1885, pp. 486 et seq.

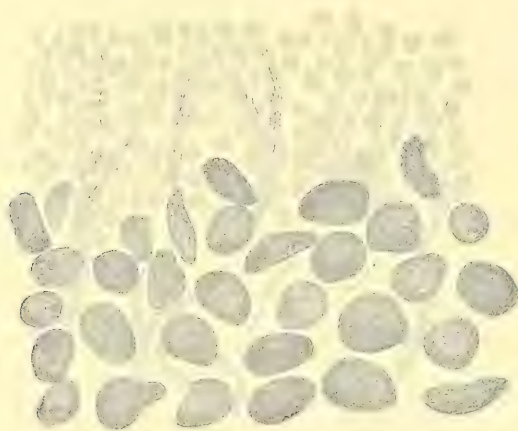
<sup>3</sup> "Il Micrococco del l'Ulcera molle," *Gazz. degli Ospitali*, 1886, pp. 38 et seq.

<sup>4</sup> "Recherches expérimentales sur la Nature intime du Principe contagieux du Chancre mou," *Comptes Rendus du Congrès Internat. de Derm. et de Syph.*, Paris, 1889, pp. 229 et seq.

Krefting,<sup>1</sup> Unna,<sup>2</sup> Quinquaud and Nicolle,<sup>3</sup> Audry,<sup>4</sup> Petersen,<sup>5</sup> Nicolle,<sup>6</sup> and by Dubreuilh and Lasnet.<sup>7</sup> The latter authors claim that they have confirmed the results of Ducrey's series of inoculations and of Unna's methods of staining the specimens, and have assured themselves of the identity of the bacilli described by these investigators.

The streptobacillus of soft chancre was found in the pus first by Ducrey, and later in the tissues by Unna. It is a rod-like bacillus of variable size and with rounded ends. The dimensions vary from 1.5 to 2  $\mu$  in length and from 0.3 to 1  $\mu$  in breadth. This micro-organism is found singly, but it shows a tendency to form chains and to become agglomerated in masses. In the pus it occurs singly, but more frequently in chains. In the tissues it is found almost entirely in chain-form. It

FIG. 185.



Section of a chancreoid, showing the streptobacillus of Ducrey-Unna in the tissues. The chains are composed of minute rods arranged linearly, mostly in two or three parallel rows, and they give off branches in their course. Single rows of the bacilli are also found. They lie between the cells, not in them, and are situated especially in the superficial layers of the tissues. Deeper down in the section they are not seen.<sup>8</sup>

has been found in all soft chancres examined by Unna, but has not as yet been cultivated. It stains with carbolic-fuchsin, and with gentian violet, anilin-water solution, and is decolorized by Gram's method—a characteristic by which it may be differentiated from other organisms occurring in chancroidal pus.

In a recent communication<sup>9</sup> Ducrey made the bold statement that

<sup>1</sup> "Ueber die für Ulcus molle spezifische Mikrobe," *Arch. für Derm. und Syph.*, 1892, *Ergänzungsheft* 2, pp. 41 et seq.

<sup>2</sup> "Der Streptobacillus des Weichen Schankers," *Monatschrift für Prakt. Dermat.*, vol. xiv., 1892, pp. 485 et seq.

<sup>3</sup> "Sur le Microbe du Chancre mou," *Bull. de la Société franç. de Derm. et de Syph.*, 1892, pp. 343 et seq.

<sup>4</sup> "Bactériologie clinique du Chancre simple, etc.," *Gaz. hebdom. de Méd.*, 1893, 2d Series, vol. xi. pp. 101 et seq.

<sup>5</sup> "Ueber Bacillenbefunde beim Ulcus molle," *Centralbl. für Bakter. und Parasitenk.*, 1893, vol. xiii. pp. 743 et seq.

<sup>6</sup> "Récherches sur le Chancre mou," *Thèse de Paris*, 1893.

<sup>7</sup> "Etude bactériologique sur le Chancre mou, etc.," *Arch. clin. de Bordeaux*, Oct. and Nov., 1893.

<sup>8</sup> This drawing was kindly made for me by Dr. George T. Elliot from a section made and stained by Dr. Unna.

<sup>9</sup> "Congrès Internat. de Médecine de Rome," *Annales de Derm. et de Syph.*, 1895, p. 50.

the soft chancre is a pathological entity, and that its specific micro-organism is the one already described. To this Finger<sup>1</sup> replied that if this Ducrey-Unna bacillus is the morbid agent of soft chancre, it is nothing more than a pyogenic microbe which produces, like the staphylococcus, a circumscribed and intense suppuration.

These observers, who devote so much time to the microscopic study of the soft chancre, are silent about its multifarious origin. Chancroid bears the same relation to mucous membranes that impetigo and ecthyma do to the general integument. Knowing as we do that chancroid may arise from so many different pyogenic processes, that it can be readily produced at pleasure by any one who will take the trouble to make the necessary experiments and inoculations, that it frequently arises *de novo* when the genital parts are subjected to irritation, dirt, and uncleanness,—it is utterly absurd to call it a specific process and due to a special specific cause. If this streptobacillus is a pus-producing agent, it may be that it follows in the wake of the well-known pyogenic microbes, after the manner of mixed infections. It must be distinctly borne in mind that when chancroidal pus is examined with high powers and oil-immersion by means of the microscope, it is invariably found to contain staphylococci, streptococci, indifferent cocci, and bacilli. The science of bacteriology is not yet far enough advanced, nor are its results sufficiently accurate and extensive in a diagnostic point of view, to warrant the statements which have been made concerning this streptobacillus.

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## CHAPTER XLVI.

### CLINICAL HISTORY OF THE CHANCROID.

*Appearances of the Chancroid.*—Chancroidal ulcers have no period of incubation, since the destructive action of the pus or of the pyogenic microbes begins at once, and the resulting lesion is apparent as soon as the morbid action penetrates beneath the epithelium. Thus, when this layer is thick the appearance of the chancroid may be delayed, and very often some time elapses during which the pus is entering a follicle. Constitutional conditions in many cases influence the rapidity of development. Chancroids on mucous surfaces develop much more quickly than upon the integument. Abrasions, excoriations, and fissures in the mucous membrane afford favorable doors of entry, and upon them chancroids develop with great promptness. As a rule, inflammatory action is very apparent within twenty-four hours after the implantation of the pus on mucous membranes, and within forty-eight hours in general the pustular nature of the lesion can be readily made out. In other cases the progress may be slower, and three or four days may elapse before the chancroid pustule

<sup>1</sup> "Congrès Internat. de Médecine de Rome," *Annales de Derm. et de Syph.*, 1895, p. 50.



is fully formed. These statements are based on the results of experimental inoculation, and are in the main correct. The statements of patients sometimes place the appearance of chancroids after connection at much longer intervals, but they are so liable to errors of observation, and often are so careless of their persons, that very little credit can be placed in them. The surgeon very often can form a more correct idea from the size and number of the lesions than he can from the patient's story.

By the aid of experimental inoculations and of clinical observation we are able to give a very clear description of the early appearances and course of the chancroid. In its course there are three stages, the active, the stationary, and the reparative.

Upon mucous membranes the very first sign of a chancroid is a minute yellow spot surrounded by a halo of intense redness, which shades off into the surrounding pink color. If not ruptured, the yellow central spot grows larger and higher, and very soon a typical conical-shaped pustule is formed. Upon the integument the same yellow spot and red halo are present, and the pustular condition may be present or may be replaced by an ulceration.

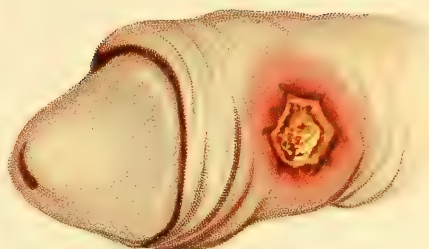
In most cases on mucous membranes chancroids very early lose their epithelial dome, which constitutes the pustule, and the typical ulcer is then seen.

The outline of a chancroid is usually either round or oval, according to the conformation of the parts upon which it is seated; but when developed upon a fissure or abrasion it may be linear or irregular. Irregularity of outline also results from the coalescence of a number of chancroids. On the prepuce and in the sulcus they are circular; about the frænum they frequently are oval; when developed partly on the glans and partly on the prepuce they are irregular, for the reason that the ulcerative process is more active on the former than on the latter. Chancroids at the orifice of the prepuce and at the anus have a tendency to follow the radiating fissures peculiar to these parts. A comprehensive idea of the clinical feature of chancroids may be gained by a survey of Plate II.

Fig. 1 shows incipient chancroids on the inner lamella of the prepuce, while in Fig. 2 a well-developed chancroid of the integument is portrayed.

Whatever the shape of the chancroid, the edges are sharply cut and abrupt, as if punched out. The whole thickness of the epithelium is destroyed, and it can be seen that though cleanly cut, as is the resulting lesion, the edges of it are slightly undermined in some cases to such an extent that the tip of a probe can be carried circumferentially around the ulcer and under it. This feature of undermined edge is due to the fact that the soft subepithelial tissues are less resistant than the more horny epithelium. In addition to the undermined condition, the edges are frequently minutely uneven or jagged, as best seen by a magnifying-glass, showing that the destructive action takes place by minute radiating processes. Around the edge of the chancroid is an areola of redness which varies in depth and width according to the stage of the inflammation. This red halo extends *pari passu* with the ulcer. The floor of the latter is peculiarly uneven and worm-eaten in appearance, and in its early stage covered with a light yellowish pellicle composed of dis-

PLATE II.



2.



4.



3.



5.



6.

Chancroids.





organized tissues and pus. With the growth of the ulcer this film becomes thicker and forms a bright or golden-yellow pseudo-membranous layer, which is shown with admirable fidelity in Figs. 1, 2, 3, and 4 of Plate II. This membranous pellicle covering the chancreoid is thrown into little uneven mammillations, which correspond to the minute rugosities which cover the surface of the ulcer.

The secretion of chancroids is in the active stage quite abundant, and, while purulent, the pus differs from that of gonorrhœa. It is thinner in quality and usually of a brownish or rusty-brown tint, due to the admixture of small quantities of blood. This chancreoid pus under the microscope is found to consist of pus-globules, red corpuscles, and the detritus of tissues.

The underlying bed, as it may be called, of chancroids should always be attentively studied. It usually consists of ordinary inflammatory œdema, and is felt between the thumb and finger as a mass firm in consistence midway between ordinary œdema and a furuncle. It is yielding to firm pressure, though not doughy, but has not the dense consistency of the true hard chancre. The œdematous infiltration of the chancreoid is not very sharply limited, but becomes gradually lost in the surrounding tissues.

In the typical hard chancre the induration, on the other hand, is condensed and sharply circumscribed. This symptom, to a certain degree important in the diagnosis of the chancreoid, is often much obscured by injudicious cauterization, particularly when the solid stick of nitrate of silver is vigorously used, and also when chromic acid, pure sulphuric acid, and indeed any very caustic application, is made. A similar misleading hardness is very often felt after active cauterization of herpetic vesicles, abrasions, fissures, and vegetations.

The **duration** of the period of activity of chancreoid is so variable that it is really indefinite. It is influenced largely by the intelligence and efficiency of the treatment, the care and attention of the patient, and by his general condition and modes of life. Alcoholic indulgence is a prolific cause of chronicity and activity of chancreoid ulceration, and plethora tends to increase it. A very active life, much walking, and physical exercise likewise tend to perpetuate the existence of these sores.

In general, chancroids exist in an active condition from two to four weeks, but they may be arrested sooner by treatment or they may thus continue for indefinite periods. The amount of destruction of tissues varies in different cases, in different localities, and in varying conditions. On the integument the ulceration is slow, and there is not the marked tendency to extension that there is on mucous membranes. In some instances the ulceration extends quite superficially over considerable surface. Then, again, the ulceration grows in extent by the fusion of a number of chancroids, as depicted in Fig. 6 of Plate II., in which it will be seen that a large portion of the surface of the integument of the penis has been invaded. In Fig. 4 an active chancreoid is seen complicated by the development of another chancreoid in the course of the lymphatics, called bubonulus—a feature first described by Nisbet.

The so-called stationary and chronic period of chancroids exists in many cases, owing to the apathy and inattention of the patient; and

these circumstances have proved to us that after a varying time the intensity of the ulceration in chancroids passes into a stage of quiescence, in which there is no marked tendency to destruction, and on the other hand none to repair. A chronic chancroid, such as is shown in Fig. 5 of Plate II., all irritating influences being at a minimum, might thus remain for several weeks or months. This aphlegmasiac condition may readily give place to exacerbation of the destructive action.

The stage of repair of chancroids is indicated by a number of changes in all of the features of the ulcer. Perhaps the most noticeable one is a diminution of the inflammatory areola and a subsidence of the underlying œdematous infiltration. Then the grayish-yellow well-marked pseudo-membranous layer begins to disappear, and as it does healthy pink granulations spring up over more or less of the surface and the unhealthy pus begins to become laudable. The undermined edges lose their deep redness and gradually disappear, and the ulcer becomes saucer-shaped. Coincidentally with this, healthy granulations make their way over the whole surface and push upward, gradually becoming even with the parts around. Then, a delicate filamentous ring of epithelium begins at the site of the undermined edge, and gradually increases in width, at the same time closing over the site of former ulceration, until, in the end, full cicatrization is accomplished. In cases where the sores have been quite large points of cicatrization spring up in the centre, enlarge, fuse together, and meet the circumferential healing ring. These minute surface-spots of healing are well described by my late colleague, Dr. Bumstead, as follows: "Macerated by the discharge, it (the spot) has a whitish look and resembles a fragment of lint which has not been removed at the last dressing; but at subsequent visits of the patient it is found to be still present, gradually increasing in size until it becomes continuous at some portion of its periphery with the margin of the sore, and it thus contributes toward the final closure of the wound."

A remarkable feature of the chancroidal ulcer is its tendency, even in the reparative stage, to retrogress and assume all of the attributes of activity. In such cases, however, there is usually some well-defined cause for the exacerbation, such as carelessness, and particularly uncleanness, sexual intercourse, or alcoholic excesses. A sore which has seemingly become of simple nature rapidly takes on all of the chancroidal features, even to great destructiveness. This possible accident should always be remembered by the surgeon in holding his patient well in hand, even when the latter regards himself as virtually well. The possibility of contagion in the advanced reparative stage of chancroid should always be impressed upon the patient. With thorough cicatrization the chancroid is annihilated; without fresh contagion there is no relapse, such as we often see in true chancre.

Scars left by chancroids vary according to the size, depth, and situation of the ulcers, and are trifling or severe in proportion to the extent of the destructive process. They may be superficial, thin, and smooth, or they may be thick and deep, uneven, and traversed by fibrous bands of various sizes. At the margin of the prepuce following a chancroid they are usually hard and fibrous and produce more or less phimosis. When superficial, but extensive, as when following a chancroid on the glans, they are thin and smooth. Extensive chancroids of the balano-

preputial furrow are usually followed by much destruction and an uneven fibrous cicatrix, often adherent to the corpora cavernosa. Chancroids of the frænum may result in a well-marked scar and more or less deformity. Chancroids producing phimosis and paraphimosis are followed by much destruction of tissue and by firm fibrous scars of varying shapes.

*Seat of the Chancroid.*—In the male the chancroid is most commonly found in the sulcus behind the glans; on the inner surface of the prepuce; on and near the fourchette, particularly on the fossæ on each side of it; on the lips of the meatus and within the urethra; upon the sheath of the penis; on the glans; and, usually by auto-inoculation, on the

FIG. 186.



Chancroid of the labia minora, of the contiguous integument, and of the margin of the anus.

scrotum and thighs, pubes and anus. They occur on the finger by contagion from genital sores, and upon the face by means of the fingers, and within the anus from pederasty. In women they are found at the introitus vaginæ; on the fourchette and vestibule and on the clitoris; on the labia minora; within the vagina (rather rarely); on the os uteri; on the labia majora, and by auto-inoculation on the integument of the latter



bodies; upon the perineum, inner surface of the thighs; on the hypogastrium, and around the margin of, and within, the anus.

Upon the external and integumental surface of the labia majora chancroids often assume the appearance of pustules or abscesses in consequence of the pus having inoculated one or more of the follicles (follicular chancroids); and there is frequently more or less œdema of the subcutaneous cellular tissue, as evinced by the swelling and hardness of the labia. When the pustule breaks the underlying ulcer, if exposed to the air, becomes covered with a scab and resembles ecthyma. (See Fig. 186.)

Chancroids are also common on other portions of the vulva and on the internal surface of the labia majora, where they occasion pain and difficulty in walking. Vulvar ulcers become much inflamed from the irritation of the urine and vaginal discharges, which likewise renders them difficult to cure. Those situated at the meatus often penetrate the urethra for some distance, giving the orifice an infundibuliform shape, or, by destroying the posterior wall of the canal, throw its opening backward into the vagina. When attacked by phagedena the loss of tissue may result in great deformity and inconvenience.

*Varying Features of Chancroidal Ulcers.*—The most simple form of chancroid is very shallow (see Fig. 1, Plate II.); the undermining of the edges is very slight, and the worm-eaten unevenness of the base very delicate. This condition may really be but the early stage of the ulcer, and appropriate treatment very soon brings about the reparative stage.

A form called by Clerc the “exulcerous chancroid” is occasionally seen. The sore is shallow and saucer-shaped, and the punched-out, sharply-cut edges are wanting. The floor is rather smooth and covered with a grayish-yellow film, and from it much pus escapes. (See ulcer just behind the corona in Fig. 4.) The two foregoing varieties are stages of development rather than different forms.

Upon surfaces where mucous membranes and integument meet, and upon the mucous membrane lining the labia majora, and on the skin in the region of the genitals, rounded conical elevations surmounted with a minute pustule are sometimes seen. The pustule increases in size, and forms an ulcer which presents a crater-like appearance, as sometimes seen in acne indurata. This lesion is called the *follicular* or *acneform chancroid*, and results from the destructive action of the pus, beginning in the hair- or sebaceous follicles and accompanied by much inflammatory swelling. It is shown in Fig. 186 on the upper part of the left labium magus. (Comparison of the outlines furnished by this figure with the colored figures will give a clear idea of chancroids in women.)

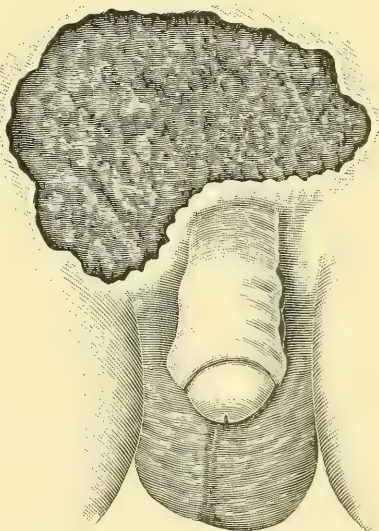
What is termed the *ecthymatous chancroid* is always met with upon the integument, particularly upon the penis and those parts of the genitals of both sexes which are not macerated with perspiration or which are not in coaptation. This variety of chancroid resembles in many of its features chancroidal ulcers produced by inoculation. It begins as a small red spot, commonly around a hair-follicle, which increases rather slowly, with a small, more or less perfectly formed, pustule in its centre. As the redness extends the pustule flattens down into a blackish-green crust, and thus may attain an area of nearly half an inch before its nature is suspected by the patient. Removal of the crust reveals a typical chancroidal ulcer, with the exception that the sharply-punched out and undermined

edges are thicker, as they are composed of epidermis; the floor is deeper, corresponding to the thickness of the skin, and the base more markedly uneven and worm-eaten. The ulcer is usually slow in its course, and secretes a moderate amount of pus, which constantly dries into a crust. Upon the integument of the penis or on the outer surface of the labia majora, where it quite frequently occurs, this chancroid is sometimes accompanied with lymphangitis and adenitis. It is well shown after the removal of crusts in Fig. 186.

In some cases of chancroids, particularly when they are seated upon the prepuce near the sulcus glandis and upon the labia minora, or on any part, in short, in which, owing to its conformation, irritation is apt to be severe, the bed, as we may call the underlying tissues, is sometimes the seat of more than usual œdema and cell-infiltration. The result is, that the chancroid is elevated above the surrounding plane, and it is then called the *ulcus elevatum*. In like manner, there is a syphilitic elevated ulcer. The salience of the *ulcus elevatum* is by some authors incorrectly said to be due to exuberant granulations, whereas inspection will show the typical chancroidal surface, with usually less undermining of the edges of the ulcer. A very good idea of the *ulcus elevatum* may be obtained from inspection of Fig. 3, Plate II. (lower and right-hand lesion) and the larger oval lesion on the right labium minus in Fig. 186.

These ulcers, showing a tendency to extend rather superficially over more or less surface, are called *serpiginous* chancroids. In my judgment, this formidable adjective is rather too loosely used, particularly by French writers. For instance, the coalesced and moderately active chancroids depicted in Fig. 6 of Plate II. might be called "serpiginous" when there is really no evidence of very unusual destruction. The term should be applied to cases which show progressive extension, where the lesion creeps over much surface. Such cases perhaps deserve this designation. In America we, for the most part, reserve the term "serpiginous chancroid" to a chronic, more or less deeply destructive, ulcer which usually has its beginning in a chancroidal bubo. These ulcers, happily rare, have a deep, irregular, fungating surface covered with a rather thick, uneven, variegated, brownish-red and grayish-green slough or membrane and a sanious pus, and having thick, bluish-red, undermined, and often everted edges, extend irregularly over the abdomen and thighs to the parts beyond, destroying more or less of the whole thickness of the skin. They are most rebellious to treatment, lasting months, years, and a lifetime, and often they lead to death from exhaustion or from perforation of the abdominal walls and peritonitis. (See Fig. 187.)

FIG. 187.



Serpiginous chancroid of abdominal walls.

What is termed *phagedenic chancroid* is an example of the most serious complication of the local contagious ulcer. Phagedena is a rather infrequent complication of both chancroid and hard chancre, and, in my experience, occurs more frequently in the course of an initial lesion than in that of the chancroid. For its production no special virus is required. It originates in local causes, such as neglect of treatment and improper treatment of chancroids, or where they are so situated that it is difficult to thoroughly irrigate them, as in chancroidal phimosis. Poverty, insufficient food, alcohol, and a crowded condition, such as sometimes occurs in hospitals, in camps, and in emigrant-ships, are predisposing causes to it. It is seen in two forms—the sloughing or gangrenous and the serpiginous. In sloughing chancroid the ulcer becomes swollen and surrounded by a deep bluish-red areola, and its floor becomes a gangrenous slough which secretes a foul brown sanies. In this condition it increases in area and in depth.

Serpiginous phagedena is similar in its appearance, but has a tendency to extend more superficially. These cases are always attended by severe local pains and a general and severe constitutional condition. The patient looks anxious and haggard, has no appetite, emaciates rapidly, and in unfavorable instances dies. The course of the affection is sometimes rather slow, and in others very rapid. In some cases a diphtheritic membrane forms over the sore, while the destructive action goes on beneath.

The course of chancroidal phagedena presents many features which point to a further bacterial infection complicating the chancroidal ulceration.

**CHANCROIDAL LYMPHANGITIS.**—Inflammation of the lymphatics is a not very frequent complication of the chancroid. It is sometimes seen as heat, redness, pain, and a cord-like condition of these vessels on either side of the penis, corresponding to the chancre. This condition may end in inflammation of the inguinal ganglia and its own subsidence, or it may go on to the formation of chancroids along the sides of the penis, and even at its root, low down on the pubes, as seen in Fig. 4, Plate II. In some cases, besides chancroidal ulcers along the lymphatics, there is a similar form of bubo.

**CHANCROIDS OF THE MEATUS.**—These chancroids are not very common, and when present involve one or both sides of the orifice. They may extend downward and involve the whole fossa navicularis. I have never seen a true case of chancroid in which the lesion was seated beyond the navicular portion of the urethra, and, although many cases have been reported, there is a strong probability that in some an error of diagnosis was made.

Chancroids of the vagina are very rare, except in old syphilitic subjects.

Chancroids of the os uteri are also exceedingly rare, and when present resemble those seen in the vulva.

**CHANCROIDS OF THE ANUS AND RECTUM.**—Chancroids of the anus and rectum may occur in either sex from unnatural coitus, but are more frequent in women, owing to the facility with which these parts are soiled with the secretion of sores situated upon the vulva. When seated upon the margin of the anus they may readily be mistaken for fissures. They are attended by much pain, especially during the passage of the feces, which should always be rendered liquid before going to stool by a muc-



laginous injection. It is sometimes advisable after clearing out the bowels to thoroughly cauterize the sore and to confine the patient to bed and a low diet, and administer opiates for the purpose of preventing any further stools until cicatrization has taken place.

Chancroids contracted in pederasty (and the same is true of chancres) are usually found upon the same side in both male and female—upon the right or left side of the penis in the one, and upon the corresponding side of the rectum in the other. This, of course, is the reverse of what holds good in natural coitus, in which a sore upon one side of the penis or vulva is most apt to be inoculated upon the opposite side of the other sex.

Chancroids of the folds of the anus, even when cured, may terminate in fissures which are very difficult to heal, in consequence of the frequent passage of the feces and the spasmodic contraction of the sphincter ani. In such cases the only certain means of relief is to be found in the forcible dilatation or rupture of the sphincter as employed in ordinary cases of fissure of the anus.

Chancroids of the anus and rectum not unfrequently escape observation from the natural reluctance of patients, especially women, to have this part of the body examined; and, indeed, the surgeon himself is often content with an inspection of the external orifice of the alimentary canal when a digital examination would reveal the presence of a chancroid in the rectum.

Chronic chancroids in women<sup>1</sup> are commonly seen in old broken-down syphilitic prostitutes. The ulcers are usually found in the vulva and may extend into the vagina. They are aphlegmatic ulcers seated on a thickened hyperplastic base and covered with a dense film formed of micro-organisms, pus, and débris of tissues.

CHANCROIDS UPON THE INTEGUMENT OF THE PENIS.—The majority of venereal ulcerations following suspicious connection and seated upon the integument of the penis are chancres and not chancroids; therefore the surgeon should be very careful in his diagnosis of ulcers in this region. The rule, however, is far from being invariable, for I have met with many cases of simple chancres situated between the preputial orifice and the root of the penis, and even upon the pubes. Chancroids upon the integument of the penis often originate in a follicle, and when first noticed resemble a pustule or small abscess (follicular chancroids). Not infrequently they extend to the loose cellular tissue and undermine the skin around a small external opening, through which the pus can be made to well up on pressure.

CHANCROIDS OF THE FRÆNUM.—Chancroids of the frænum are especially painful, persistent, and liable to hemorrhage. They may commence either upon the free margin or at the base of the bridge. In the former case a rent or fissure, the result of violence during coitus, has probably been inoculated, and the resultant chancroid gradually eats away the whole frænum and hollows out a narrow longitudinal groove upon the under surface of the glans, giving great annoyance, long persisting, and resisting ordinary modes of treatment. Again, they may proceed from chancroids in the neighborhood, which exhibit a remarkable tendency to involve the

<sup>1</sup> The reader is referred to a systematic essay on the subject entitled "Chronic Inflammation, Infiltration, and Ulceration of the External Genitals of Women," by R. W. Taylor, M. D., *N. Y. Med. Journal*, Jan. 4, 1890.

frænum, if situated near it. In this case the base of the frænum is first attacked, and often becomes perforated from side to side; this chancroidal opening gradually enlarges, extends to the free margin, and, as in the former case, probably destroys the whole bridle. The frænum is copiously supplied with blood and exceedingly sensitive; hence, ulcers of this part are very liable to bleed and give rise to much suffering. Their persistency and destructive tendency are due to the frequent rupture of the longitudinal fibres of the frænum, occasioned by the constant motion to which it is exposed in walking, handling the penis during micturition, in erections, etc. Minute rents are thus caused in the sore, which become inoculated and increased in depth; an ulcerative action goes on until the whole bridle is destroyed, including the portion buried in the under surface of the glans; and hence the fossa already referred to. Occasionally they extend to the urethra and give rise to a urinary fistula. In the treatment of these ulcers the patient should be directed to avoid all motion of the part which will stretch the frænum; the glans should not be uncovered except to dress the sore, and even then no further than is absolutely necessary to insert the dressing.

SUBPREPUTIAL CHANCROIDS.—Chancroids beneath the prepuce are usually multiple, cause much inflammatory oedema, and exhibit a marked tendency to extensive ulceration. In proportion as the prepuce is long and tight at its orifice there is a tendency to the production of chancroidal phimosis. In many cases chancroidal ulcers form at the preputial orifices of the fissures, which may be present there as a result of efforts to retract the prepuce. (For further particulars see section on Chancroidal Phimosis.)

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## CHAPTER XLVII.

### CEPHALIC AND EXTRAGENITAL CHANCROIDS.

In the early days of the discussions between the unicists and dualists the latter made what they considered a strong point in claiming that the virus of syphilis acted upon the tissues of the head, face, and mouth, and that the secretion of the chancroid was powerless to penetrate those parts. This sweeping statement led to extensive investigation to ascertain whether the alleged exemption was founded on fact. Fournier<sup>1</sup> took a prominent part in this labor, and, from a diligent search through medical works and inquiry of those who made a special study of venereal diseases, was able to collect 150 cases of venereal ulcers upon the head and face, all of which, however, with the exception of 5, were chancres. These five exceptional cases, in which the ulcer was supposed to be a chancroid, had been observed by MM. Ricord, Venot, Devergie, Bassereau, and Diday; but Ricord confessed that his case, an ulceration at the base of one of the superior incisor

<sup>1</sup> "Étude sur le Chancre céphalique," *Union médicale*, Feb. and March, 1858.

teeth (figured in his *Iconographie*, pl. xxi.), was unreliable, and the other four were thought to be imperfectly reported; and thus there could remain no doubt of the rarity of the chancreoid upon the region in question.

It has been since ascertained that the chancreoid can be developed upon the head and face by artificial inoculation. Nadau des Islets<sup>1</sup> and Rollet<sup>2</sup> have inoculated its virus with success upon different parts of the head in 20 instances; Bassereau<sup>3</sup> and Prof. Huebbenet<sup>4</sup> of Kieff upon the lips and cheeks in 5; Robert<sup>5</sup> upon the temple, nose, and lips in 3; and in all the sore so produced was entirely free from induration and was not followed by secondary symptoms. Horteloup<sup>6</sup> alludes to an inoculation with chancreoid on the forehead in which five days elapsed before the appearance of the characteristic pustule.

Still further, at least two instances of the occurrence of chancreoids upon the cephalic region have been met with in clinical experience, in which every precaution appears to have been taken to establish the diagnosis. The first is reported by Fournier himself from the notes of M. Puche of the Hôpital du Midi: the sore was situated upon the lower lip, and artificial inoculation of its secretion upon the patient's abdomen, as well as an accidental inoculation upon the patient's thumb, proved successful; no general symptoms showed themselves within seventy-four days from the appearance of the ulcer, during which period the patient was kept under observation.<sup>7</sup> In the second case, observed by M. Profeta,<sup>8</sup> a serpiginous chancreoid of two years' duration was situated upon the face, and its secretion was inoculated in five places by Profeta upon himself, with the effect of producing five chancreoids, which have not been followed by any symptoms of syphilis during eighteen months that have since elapsed.

Besides these cases there are four others in literature which merit mention, and still others which have their weak points.

Diday<sup>9</sup> reported the case (his second) of a young girl having genital chancreoids and similar ulcers in the mouth. Rollet concurred in Diday's diagnosis. The case, however, is not perfectly satisfactory to me.

Labarthe's<sup>10</sup> case was that of a man who had chancreoid and bubo, who wounded his lower lip with the pin which held his dressing, and as a result a chancreoid developed.

My own case<sup>11</sup> was that of a laborer who had chancreoids on the penis, and who fell and received a lacerated wound of the eyebrow. By accident he smeared this wound with the pus from his chancreoids, and a typical ulcer developed. I made successful inoculation with the pus from the supraorbital ulcer.

<sup>1</sup> "De l'Inoculation du Chancre mou à la Région céphalique," *Thèse de Paris*, 1858.

<sup>2</sup> *Gaz. méd. de Lyon*, Dec., 1857.

<sup>3</sup> Buzenet, "Du Chancre de la Bouche," *Thèse de Paris*, 1858, p. 41.

<sup>4</sup> *Union méd.*, Paris, 20 Mai, 1858.

<sup>5</sup> *Nouveau traité des Mal. vénériennes*, Paris, 1861, p. 380.

<sup>6</sup> "Note sur la Chancre simple, etc.," *Annales de Derm. et de Syph.*, 1880, p. 62.

<sup>7</sup> *N. Dict. de Méd. et de Chir.-prat.*, Paris, t. vii. p. 76.

<sup>8</sup> *Gaz. méd. de Lyon*, 9 Juin, 1867, p. 275.

<sup>9</sup> "Observation de Chancrelle de la Bouche," *Annales de Derm. et de Syph.*, No. 2, 1873.

<sup>10</sup> *Le Chancre simple chez l'Homme, etc.*, Paris, 1873, pp. 61 et seq.

<sup>11</sup> "A Case of Cephalic Chancroidal Ulceration resulting from Accidental Inoculation," *Arch. of Scientific and Practical Medicine*, 1873, No. 5, pp. 405 et seq.



Pellizzari<sup>1</sup> also reports the case of a man who accidentally inoculated his face, producing a chancroid. Inoculation of the pus of this accidental ulcer was followed by positive results.

Jeanselme<sup>2</sup> reports the case of a man who in all probability inoculated his chin with the pus of a chancroid on the penis. Inoculation-experiments of the pus from the penis and chin were successful, and the author further says that he found the pathognomonic bacillus of the soft chancre.

It will thus be seen that the occurrence of the chancroid about the head, face, and mouth is very exceptional, and that the old-time contention that chancre and chancrous lesions of these parts are almost always followed by syphilis has not been proved wholly false.

Pospelow<sup>3</sup> reports, with a colored picture, the case of a woman who had genital chancroids, with a typical chancroid on the nipple, in which she undoubtedly inoculated herself by transference of the pus from the genitals to the breast.

Nové-Josserand<sup>4</sup> reports four cases—two men and two women—whose fingers became infected with chancroidal pus from ulcers of the genitals. These cases, while not common, are not so very rare. I have seen several such.

Mauriac<sup>5</sup> details a case of soft chancre of the little finger in which there was a typical axillary bubo.

Cases are sometimes seen in which several regions are synchronously the seat of chancroids. Thus, Coquet<sup>6</sup> reports a case in which a man had one typical genital ulcer, several chancroids of the scrotum and anal region, and eight ulcers on the scalp. The lesions near the genitals were the result of more or less direct inoculation, while those on the head were produced by scratching and the transference of pus by the fingers.

In a case reported by Légrain<sup>7</sup> a man with chancroids and bubo produced on his legs and arms near the axillæ several crops of chancroidal ulcers, about fifty in number, which were caused by scratching with soiled fingers.

<sup>1</sup> "Della Trasmissione accidentale della Sifilide," *Giorn. Ital. delle Mal. ven. e della Pelle*, 1882, pp. 193 et seq.

<sup>2</sup> "Contribution à l'Étude du Chancre mou céphalique, etc.," *Gaz. hebdom. de Méd. et de Chir.*, Dec. 9, 1893, p. 581.

<sup>3</sup> "Ulcus molle mammæ," *Internat. Atlas of Rare Skin Diseases*, 1889, Part 2.

<sup>4</sup> *Province médicale*, July 4, 1891.

<sup>5</sup> *Journ. de Méd. et de Chir.-prat.*, 1891, p. 580.

<sup>6</sup> *Annales de la Polyclinique de Bordeaux*, May, 1893.

<sup>7</sup> *Annales de Derm. et de Syph.*, 1892, pp. 931 et seq.

## CHAPTER XLVIII.

## DIAGNOSIS, PROGNOSIS, AND TREATMENT.

IN various stages the chancroid may be mistaken for herpes proenitalis, exulcerated balanitis, ulcerated fissures and abrasions, hard chancres, mucous patches, ulcerating syphilides, and epithelioma.

When a number of herpetic vesicles are grouped on the genitals with their polycyclic outline, their shallow and not much ulcerated surface, with the history of antecedent pains, their diagnosis is easy. In cases in which there is much inflammation a doubt may exist, but while ulcerous herpes may extend deeper into the tissues, it does not, as a rule, like chancroid, extend peripherally by ulceration. Herpetic vesicles coalesce because they are so closely grouped; chancroids coalesce by peripheral extension and fusion with each other. A single herpetic vesicle may be mistaken for a chancroid, but observation of its course for a day or two will settle the question of its nature. The crucial test of auto-inoculation of the secretions will in the case of chancroid be followed by a similar lesion, whereas failure would follow in the case of herpes proenitalis. It must be remembered, however, that in uncleanly persons, in those whose vesicles have been injudiciously cauterized, in persons of poor fibre, in plethoric subjects, and those given to drink herpes proenitalis often takes on features identical with those of chancroids. Indeed, they may be the starting-point of chancroids.

Exulcerated balanitis is commonly very readily recognized. Its lesions begin in patches much larger than chancroidal ulcers, usually with a history of inattention to cleanliness or of phimosis, and their edges are not undermined, nor are their surfaces ulcerated or worm-eaten, but rather smooth and velvety.

Very frequently, patients, particularly men, are much exercised over traumatic fissures and abrasions. When much inflammation is present a reserved diagnosis may be made, but cooling applications will cure the simple lesion, whereas the chancroid will be only slightly improved. Water dressings and time will make the diagnosis between a simple lesion, a chancroid, or a hard chancre, the last of which these seemingly simple lesions often prove to be. This fact cannot be kept too prominently in mind.

Mucous patches may in a measure resemble chancroids if very much irritated, but it is an exceeding rarity to see them present and of the appearance of the chancroid. Usually their mode of development, size, situation, their well-marked salience, their configuration, peculiar color, and their coexistence with a history of syphilis or with syphilitic lesions point out their specific nature. It must be remembered that about the genitals of both sexes mucous patches and condylomata lata are often much irritated and give issue to an irritant pus which is auto-inoculable.

In old syphilitics, both male and female, particularly those who are cachectic or broken down by dissipation, ulcers having all the characters of chancroids, but of greater depth, are not uncommonly seen. They have a soft base, are very often multiple, particularly in women, very sluggish in

their course, usually unaccompanied by ganglionic reaction, but attended by a profuse purulent secretion. In some instances I have seen their pus produce other similar ulcers by auto-inoculation, and I have seen several cases in which their secretion produced undoubted chancroids in coitus. These ulcers in women are commonly attended with much œdema and cell-infiltration, and may exist months and years. They in somewhat rare cases become phagedenic. In men, though occasionally very chronic, they are less formidable.

It is scarcely conceivable that chaneroid can be mistaken for epithelioma, yet my colleague, Dr. Bumstead, saw in consultation a case in which this accident occurred. When it is considered that cancer and epithelioma do not begin as ulcers, but as small nodules and warty growths, particularly on parts the seat of antecedent chronic irritation, the diagnosis seems very easy.

**Prognosis.**—In the majority of cases the prognosis of chancroids is good. When intelligent and efficient treatment is instituted early, the affection is soon cured. Carelessness of the patient, dissipated habits, and excessive physical exercise render a prognosis less positive and assuring.

When phimosis or paraphimosis is present the outlook is more grave, since, unless the patient can be put under perfect control on his back, the progress of the case will be inevitably bad, and may result in more or less loss of tissue or deformity of the penis, may be complicated by severe hemorrhage, or result in phagedena or gangrene. Lymphangitis and buboes may be produced, which may lay a patient up for a long time, besides entailing upon him much suffering and misery. In such cases the immunity to systemic infection enjoyed by the patient is a source of much comfort to him. Chancroids of the meatus and urethra under unfavorable circumstances result in stricture.

In women the prognosis of chancroids is less favorable, even in mild cases, than in men. The difficulties of properly treating them, unless they will remain in bed under the care of a nurse or in a hospital, are very great. The conformation of their parts, the presence of normal and abnormal secretions, the setbacks caused by menstruation, and the difficulty of retaining properly the dressings,—all tend to prolong the course of the ulcers. Further, women as a rule are not docile patients.

Young surgeons are prone to fear phagedena and gangrene in the course of chancroids. These formidable complications are usually not to be feared early in the course of these lesions. I have in private practice never seen them begin in an uncomplicated young chaneroid, though in armies, jails, and emigrant vessels, and among the squalid poor and drunkards, they often begin quite early. There is usually, in these cases, a history of injudicious treatment, particularly in the way of improper cauterization, an absence of treatment, and inattention on the part of the patient, or of inaccessibility of the ulcers in consequence of complications, such as phimosis or paraphimosis. The presence of complications should always render the prognosis more guarded, particularly in persons of poor fibre and in those given to drink.

**Treatment.**—The most sensible and efficient prophylactic measure is thorough cleansing of the genitals in every fold and recess. In the treatment of chaneroid it is important to know what not to do—namely, *not*



*to give mercury and treat the case as one of syphilis, which is the custom of many practitioners; not to employ the curette as an abortive or curative means in the very early stages of the ulceration; not to cauterize injudiciously and indiscriminately; not to use ointments and fatty preparations; and never resort to excision.* Nothing but harm can follow any of these procedures.

Cauterization of chancroids has for its object their destruction and their transformation into simple lesions. To-day this treatment is not largely followed, owing to the tendency which has increased within the past fifteen years, to limit it to certain cases. The agents now mostly used are nitric acid and carbolic acid. Carbusulphuric paste, Vienna paste, Canquoin's paste, acid nitrate of mercury, chloride of zinc,<sup>1</sup> and solutions of caustic potassa are deservedly passing into oblivion.

It is of prime importance that patients suffering from chancroids should be as quiet as possible—that they should rest at every opportunity, should not attempt severe muscular exercise, nor walk, jump, dance, nor ride on horseback. Care should be taken that friction and pressure of the penis be avoided. Alcoholics should be uncompromisingly interdicted, and plain digestible food taken.

The most rigid attention to cleanliness and to keeping the parts very dry are necessary during the existence of chancroids.

Destructive cauterization is only applicable for chancroids in the early stage and before the ulcers become complicated by much œdema. Before using it—in fact, before making any application to chancroids—the ulcers and the surrounding parts should be thoroughly cleansed with soap and water, and then well irrigated with a very warm or hot solution of bichloride of mercury (1 : 2000). No chancroid should be thus treated which cannot be thoroughly exposed and afterward carefully dressed. The technique of applying the acid—and in most cases liquid carbolic acid answers every purpose—is very simple. The surface of the ulcer must be carefully dried, and then the acid thoroughly applied by means of a bit of absorbent cotton wound around the end of a wooden toothpick. Care must be taken that the undermined edge is thoroughly touched, but that none of the liquid escapes on the surrounding parts. Some authors recommend that the application of carbolic acid shall be preliminary to that of nitric acid, the former playing the rôle of an analgesic. In the vast majority of cases within the lines already indicated this double cauterization is wholly unnecessary. Such is the evanescent character of the pain produced by carbolic acid, which is soon followed by a sensation of coolness and numbness, that patients make scarcely any complaint from its use.

When the chancroidal film at the floor of the ulcer is rather thick, it may be necessary to use the stronger caustic nitric acid, which may be done in the manner just indicated; but it is always well to first apply a 10 per cent. solution of muriate of cocaine. By this means the patient suffers no pain, and the surgeon may be more thorough in his application. There is no necessity for the use of a long glass stopper or of a glass rod

<sup>1</sup> Balzer and Souplet have recently revived the use of chloride of zinc in the treatment of chancroids (*Bull. médical*, 1891, No. 8, p. 899). They use a paste known as Socin's paste, made in the following proportions: Chloride of zinc, 5 to 6 parts; oxide of zinc and water, of each 50 parts. This is essentially Canquoin's paste, which I think has not been used in America for years. It was an uncertain remedy, and often produced severe irritation.

in applying nitric acid, since it can be done much more perfectly with the absorbent cotton on the end of a wooden toothpick. It is usually well for a few hours after these caustic applications to apply water dressing or lead-water on lint.

The actual cautery and Paquelin's thermo-cautery are very efficient destructive agents, but their use is greatly restricted in consequence of the dread inspired in the mind of the patient by them. Though the parts may be thoroughly benumbed by cocaine, few persons can avoid shrinking when they see the incandescent wire or cauterizer.

A word of warning is necessary against the use of the stick nitrate of silver, which, unfortunately, is largely used by the laity and many physicians, not only for chancroids, but also for simple fissures, erosions, and herpetic vesicles. This agent irritates, while it does not destroy; it intensifies the patient's sufferings, obscures the nature of the lesion, rendering diagnosis impossible, and produces so much inflammatory oedema in the lesion and around it that it is frequently mistaken for a hard chancre. Its use is to be emphatically condemned.

In this connection it is well to emphasize the fact that mercurial ointment is especially baneful to chancroids, particularly in their active stage, during which any fatty application is productive only of mischief.

*Treatment Subsequent to Cauterization.*—Such is the superficial action of carbolic acid when delicately applied that under proper conditions no inflammatory reaction is to be feared. With nitric acid, on the contrary, unless temporary water or lead-water dressings are used, there is a danger of producing subchancroidal and circumferential cedema and cell-infiltration. This is a complication much to be avoided, since it inevitably retards the cure. It is also very necessary in any case where several chancroids—or even one large one—have been cauterized that the patient should remain in the recumbent position from a half to a whole day.

For chancroids upon the glans and prepuce and in the vulva the interposition of pledgets of lint or of absorbent cotton is necessary. Whatever application is used, it should be changed at short intervals and directly destroyed, preferably by fire. Care must be exercised that the parts be not wounded in changing dressings. In addition, patients should be instructed to very carefully wash the parts, using a little bunch of absorbent cotton with soap and warm water, and then thoroughly immerse them in a sublimate solution (1 : 2000). For women too much insistence upon cleanliness is not possible, since they, even the most cleanly of them, are liable to be derelict. They should be instructed to thoroughly and copiously irrigate the vagina several times daily with a mild and hot alkaline solution (borax or supercarbonate of soda,  $\mathfrak{zss}$ , to water,  $\mathfrak{3lxiij}$ ), followed by a hot solution of sublimate (1 : 5000).

The most efficient all-round application to chancroids is iodoform, since it is an undoubted promoter of healthy granulations and a local sedative. It should only be employed in the form of an impalpable powder, either pure or in combination with some bland and absorbent powder, such as subnitrate of bismuth, starch, magnesia, boracic acid, or powdered sugar of milk. Its odor is its great drawback, but even in private practice the expedients of the patient or surgeon may be such that its use does not compromise the former. Various essential oils are mixed with it, but, after all, coumarin, the active principle of Tonka beans, is yet the best

disguise. Powdered roasted coffee also is good. When used in powder form the ulcerated surface should be fully but not copiously dusted with it, and over it a thickness of perfumed lint or absorbent cotton may be placed. It may be employed suspended in sulphuric ether (3ss-3j to 3j) or in similar proportions in glycerin, 3ij, aq. 3vj. I have been unfavorably impressed by its use when combined with vaseline and other fatty bases.

It is important to remember that the action of iodoform is that of producing healthy granulations, and that when this has been effected its use should be suspended, since upon granulating surfaces it often acts by even impeding healing. Further, from these surfaces it is liable to be absorbed and produce toxic effects upon the skin and system at large. The conclusion, therefore, warranted is that *the use of iodoform should be suspended when chancreoids take on a granulating surface.*

It has been claimed that iodol, a preparation containing a large percentage of iodine, is equally as efficient as iodoform, and has the advantage of being odorless. Unfortunately, our hopes have not been realized, since this agent is frequently found wanting in test cases. When there is a moderate amount of ulceration its action is fairly as good as that of many old remedies.

Euophen was used by Estay<sup>1</sup> in the Hôpital du Midi in the treatment of chancreoids, and was found to be mildly caustic and to have healing qualities. It is claimed that, as this drug contains 28 per cent. of iodine, it is better than iodoform, and that it has no odor.

In like manner, the subiodide of bismuth was vaunted as the substitute for iodoform. In my hands chancreoids have crept on, leaving this substance as a deep red crust over the ulcer, while it was very annoying to the patient by reason of the staining of his under-linen.

Within the past ten years I have used with some advantage salicylic acid, which is odorless and does not stain the linen. It, however, is not invariably reliable like iodoform. For ordinary chancreoids and ulcerated herpes progenitalis five grains of the acid suspended in an ounce of water is a good lotion. Combined with subnitrate of bismuth, 1 : 4 or 1 : 8, salicylic acid may be used even when chancreoids are active.

Recent experiments with resorcin and pyrogallol has convinced me that they are not equally as reliable as iodoform. In many cases they act fairly well, but they are powerless in arresting serpiginous chancreoids.

In the cicatrizing or reparative stage of chancreoids, not earlier, much progress is often made by judicious applications of a solution of nitrate of silver, 10 : 20 grains to the ounce, made every few days. The parts are prepared by careful irrigation, then they are dried, and the solution is carefully and sparingly applied.

It may be not amiss to mention Du Castel's<sup>2</sup> treatment of these ulcers. This surgeon recommends the following as a topical application: Alcohol, 10; acid. carbolic., 1. After this mild cauterization the parts are covered with powdered salol or aristol.

Aristol is sometimes very beneficial in the treatment of chancreoids, but it cannot be depended upon in rebellious cases, as iodoform can. It is

<sup>1</sup> *Thèse de Paris*, 1893.

<sup>2</sup> "Le Traitement du Chancre simple," *Rev. gén. de Clin. et de Therapeut.*, 1891, Nos. 16 and 17.



very necessary to irrigate the ulcers with the bichloride solution (1 : 2000), and then dry them before the aristol is applied.

Formalin, used pure or in dilution with water 40 and 10 per cent., has been used with much success by Gaylord<sup>1</sup> in both chancroids and chancroidal buboes. It is said to cause quite severe pain, but to be productive of prompt healing.

The following lotions are also useful in many cases :

R̄. Zinci sulph.,	gr. viij ;
Spts. lavand. comp.,	ʒij ;
Aquæ,	ʒiv.—M.
R̄. Argenti nitrat.,	gr. j ;
Aquæ,	ʒiv.—M.
R̄. Liq. sodæ chlorinatæ,	ʒij ;
Aquæ,	ʒiv.—M.
R̄. Acid. boracic.,	ʒiss ;
Aquæ,	ʒiv.—M.
R̄. Vini aromat.,	ʒij ;
Aquæ,	ʒiij.—M.

The seat of chancroids materially modifies the method of treatment. For those lesions under the prepuce dry powders may be used, and great care must be taken to avoid œdema, for that brings in its train phimosis and paraphimosis, two very annoying and serious complications. On the integument it is often difficult to keep dry powders on the ulcers, in which case watery applications may be used, or powders covered over with lint, cotton, or gauze moistened in water.

At the frænum chancroids are prone to become the seat of œdema, to hemorrhage, to eat through the base of the bridle itself. Therefore they require especial care, particularly as œdema at this region is always followed by phimosis, even if the prepuce is ample.

Chancroids at the margin of or within the urethra must also be carefully treated, and it is well to avoid cauterization, since it is so liable to produce œdema, to cause the ulcers to become more active, and even result in stricture.

If the chancroids are just at the lips of the meatus, they should be well irrigated with a hot bichloride solution (1 : 2000) or carbolic acid and water (1 : 250–500). After drying the parts should be covered with iodoform or aristol, and then well bandaged with a mass of absorbent cotton carefully retained.

If the chancroids are about an inch down the urethra, the parts should be first irrigated with the solutions just mentioned. Then a No. 12 French catheter, cut off at a length of four inches and lubricated with glycerin, should be passed into the urethra beyond the ulcers, and then by attachment with an irrigator fully a quart of the antiseptic solu-

<sup>1</sup> *Medical News*, Oct. 27, 1894.

tions mentioned should be retrojected. Then iodoform or aristol is insufflated into the urethra, which is packed with absorbent cotton.

Chancroids under the prepuce must be treated after the manner of phimosis, plus that of destructive ulceration. Subpreputial injections of hot (1:2000) sublimate solution or of carbolic acid and water (1:150) should be used very often by means of my flat syringe nozzle, taking care to get the irrigating liquid well behind the glans. Then iodoform suspended in glycerin and water should be introduced. It is better in all cases to anticipate gangrene, and if the progress in treatment is not perfectly satisfactory to make two lateral incisions into the prepuce as far back as the glans, which will place all of the affected parts at the disposal of the surgeon. Fears of inoculation of the incisions need give the surgeon no disquietude. (See chapter on Phimosis.)

In paraphimosis complicated with chancroids it is well to refrain from cutting if possible; but if the constriction tends to produce strangulation, the encircling band at the bottom of the sulcus must be cut as directed in the section on Paraphimosis.

Chancroids in women demand the utmost attention to cleanliness, very much prudence and care in cauterization, and thorough and frequent dressings. Their surfaces should be kept free from all discharges, and all coapting parts should be separated. In like manner, chancroids of the anus must not be injudiciously cauterized; they should be carefully dressed, the parts being separated. Attention should be paid that the stools be rendered liquid in consistence.

Since the era of violent and indiscriminate cauterization has departed and iodoform has come into use, the ravages of serpiginous chancroids, phagedena, and gangrene are much less common and less severe than formerly.

The treatment of serpiginous chancroids should be both local and general. Wherever there is debility, it is to be combated with nutritious food, tonics, and, if necessary, stimulants. Locally, after prolonged immersions of the parts in water as hot as can be borne and irrigations with 1:2000 hot sublimate solutions, the surface may be touched with nitric acid or bromide and glycerin (1:8), care being taken that the ulcerating furrow at the edge be thoroughly touched. The whole may be temporarily covered with lint or absorbent cotton moistened with dilute Labarraque's solution, 1:10 of water. After this iodoform may be applied quite freely, and the whole surface covered with absorbent or iodoform gauze, over which is a layer of gutta-percha tissue. While this treatment is usually successful, cases do occur which tax the resources of the surgeon and call in play all manner of therapeutical expedients in the way of remedies and methods of application. In some cases the systematic use of the curette, particularly at the margin of the ulcer, produces good results.

Phagedenic chancroids, commonly seen in neglected cases, in ulceration in inaccessible places, and those injudiciously cauterized, and occurring mostly in unhealthy subjects, require the most careful attention to diet, hygiene, and surroundings. The vital powers must be sustained by tonics and stimulants, and opium must be given to relieve the pain and quiet the nervous anxiety of the sufferer. The next essential is to determine whether syphilis is a factor in the process, since in pro-

portion as that diathesis is active in such cases, so is mercury beneficial; whereas it is positively injurious in simple phagedenic chancroids. I have never seen any benefit result from the use of the potassio-tartrate of iron, which Ricord used to call the "born enemy of phagedena." In this complication of the chancroid the dermal curette may be employed with benefit to remove débris of tissue, sloughs, and pultaceous matter from the surface and edges. Then the whole surface may be thoroughly but carefully touched with nitric acid, with the bromine solution (1:3) of glycerin, or with the actual cautery, care being exercised that the surrounding parts are not injured. Phagedena complicating chancroidal phimosis necessitates incisions sufficiently extensive to allow the parts to be reached. In addition to this direct medication, the most important measure is the immersion of the parts or of the whole body in a hot sitz-bath (98° to 102° Fahr.) for from eight to twelve hours a day, care being taken that the comfort of the patient is attended to in every particular. I have seen in my hospital practice the most salutary results from this treatment in very unpromising cases in which the destructive action ceased and reparative action began in from two to thirteen days.

Where the phagedena attacks the distal portion of the penis, irrigations of hot water, of hot sublimate solution (1:2000) by means of a spray syringe for several hours a day, have proved very efficacious in my hands. When healthy granulations appear the surfaces may be dressed with balsam of Peru and covered with absorbent gauze.

Since Aubert<sup>1</sup> in 1884 demonstrated the fact that when subjected to much heat chancroidal ulcers promptly lost their destructive tendency, many observers have advocated this agent, but only in a half-hearted way. Within recent years Welander<sup>2</sup> has claimed striking results from the application of heat by means of hot water (50° to 52° C.) passing through thin lead tubes, which are held in apposition to the ulcers. Arnozan and Vigneron<sup>3</sup> and J. Fournier<sup>4</sup> claim excellent results from the use of hot-water applications (as high as 120° F.) to chancroids, and also to the buboes which follow them.

The truth of this matter is about as follows: Hot water of as high a temperature as can be borne is very curative in cases of obstinate chancroids, but it is rendered much more potential by the addition of bichloride of mercury (1:2000) and of carbolic acid (1:250 or 500). The solutions may be held either in a fountain syringe or a two-quart rubber irrigator, supplied with a long, thin soft-rubber tube, to which is attached the little nozzle which looks like a miniature watering-pot spout, which accompanies most soft-rubber syringes. Thus equipped, the surgeon is prepared for any case, whether phagedenic or gangrenous.

<sup>1</sup> "De l'Atténuation du Virus du Chancere mou par la Chaleur," *Annales de Derm. et de Syph.*, 1883, pp. 736 et seq.

<sup>2</sup> "Traitement du Chancere mou par la Chaleur," *ibid.*, 1892, p. 1194.

<sup>3</sup> "Du Traitement de la Chancrille et du Bubon chancrilleux par les Applications locales d'Eau chaude," *Journ. de Médecine de Bordeaux*, vols. xx. and xxi., July and August, 1891.

<sup>4</sup> "De la Virulence du Chancere simple, etc.," *Thèse de Bordeaux*, 1892.



## CHAPTER XLIX.

## BUBOES.

By the term "bubo" we understand an inflammation of a hyperplastic or suppurative character, or both conditions combined, in the ganglia of the inguinal or crural regions.

While, in general, it is well to retain the classical division of buboes into the simple and virulent forms, it is necessary, for clearness of description, to consider quite fully the causes which give rise to these glandular swellings and abscesses.

Pathology has conclusively proved that whenever gland-tissue becomes inflamed it is always as the result of some poison or toxine or of some micro-organism, pyogenic or non-pyogenic, carried by the lymphatic vessels from some inflammatory focus. In like manner, in malignant diseases, particularly epithelioma of the penis, some unknown but irritant secretion is carried to the contiguous ganglia, and there it causes a malignant process and sometimes a suppurative condition. We are unable to say which is the exact agent in the causation of the glandular hyperplasia due to syphilis.

When we recognize the fact that every bubo depends on a distinctly irritative or inflammatory cause, we can reject as being unscientific the terms "sympathetic bubo" and "bubon d'émblée." These terms imply ignorance. If in a given case of bubo we cannot ascertain the exact site and nature of the extragenital morbid focus in which the poison was elaborated, we can be absolutely certain that such poison, either as a toxine or as micro-organisms, existed and gave rise to the morbid process which in old times was spoken of as sympathetic or as bubon d'émblée.

So much for the pathogenic cause: now let us consider its action. Perhaps the poisonous secretion is small in amount and not very active; the effect upon the ganglia then will be mild. This is the condition so frequently observed in gonorrhœal adenitis. But in some cases this poison is active, and then suppuration occurs.

Undoubtedly, many mild inflammatory swellings of the inguinal ganglia are the results of trifling irritation and suppurating processes on the toes, legs, scrotum, penis, and anal region. It may be that these local lesions are very mild and ephemeral, but in their short life they give off sufficient poisonous secretion to cause more or less inflammatory reaction in the crural and inguinal ganglia. Now, there may be in the regions just mentioned more severe inflammatory processes, in which the potentiality of the poisoning dose is greater, and as a consequence there is true suppuration in the ganglia of the groin. Undoubtedly, a large proportion of the suppurating buboes which we see in dispensary and hospital practice is caused by genital and extragenital inflammatory lesions of which the patient can give us little if any information.

While we can speak with much positiveness of the existence of tubercular adenitis in the neck, we know little of an analogous inguinal adenitis. It is perfectly conceivable that if a tubercular focus exists in the regions in which the lymphatics which centre in the groin take their

origin, these vessels may carry to these ganglia tubercular infection. On this subject our knowledge is very meagre. I may even say that we know nothing definite concerning it. This naturally leads us to allude to strumous buboes of the groin. These buboes are simply hyperplastic ganglia in which a low grade of suppurative process goes on and involves the overlying skin in a chronic unhealthy or phlegmasic inflammation, which causes for long periods only slight destruction of tissues and moderate suppuration composed of an unhealthy form of pus. This is all that we can positively say of the strumous bubo. It is not essentially a sharply-marked morbid process, but a chronic unhealthy adenitis, which has been started in the same way that the majority of suppurating buboes do.

We now come to the so-called virulent bubo, which is a more active and destructive form than any we have thus far considered. As late as the year 1884 it was received as gospel truth that the virulent bubo was caused by the virus of the chaneroid, and great was the consternation in the camp of the dualists when Straus<sup>1</sup> bluntly made the assertion that in the pus of forty-two cases of chancroidal bubo he had found no micro-organism, and when he inoculated this pus aseptically as taken from the bubo his experiments invariably failed. Straus convinced himself (and I know of no advocate of dualism who has assailed his position) that whenever this bubo becomes virulent and destructive it is because it has been contaminated with chancroidal pus after it has been opened. Now, I am prepared to go a little farther than Straus—and I speak from observation and experience—when I say that in some cases in which there has been absolutely no chancrous pus-contamination of the abscess, dirt, uncleanness, and carelessness have caused the suppurating process to become virulent and to assume all the features and qualities of a typical chancroidal abscess.

Spitschka<sup>2</sup> has gone over this subject, and, like Straus, concludes that the pus of buboes resulting from chancroid is absolutely free from all micro-organisms. Although the pus of chancroidal buboes may not contain micro-organisms, the clinical fact remains that this form of bubo shows evidence of a more active and destructive suppuration than do the simple forms.

Since we have a fairly good scientific idea of the *materies morbi* of buboes, we can venture upon a classification which will work well in clinical study and will serve as a basis for precise surgical procedures.

The buboes due to epithelioma and syphilis will not be considered here, since they are treated of in their proper places.

In general, it is well to retain the terms simple and virulent bubo, and to bear in mind, at the same time, that the only difference between them is that due to the mild potentiality of the poison in the simple form, and to the concentration and activity of the morbid secretion which produces the second form.

Inguinal buboes are found in practice in the following forms and conditions: 1, simple hyperplasia of one or more ganglia—mono- and poly-

<sup>1</sup> "Sur la Virulence du Bubon qui accompagne le Chancre mou," *Annales de Derm. et de Syph.*, 1885, pp. 9 et seq.

<sup>2</sup> "Beiträge zur Aetiologie des Schanker Bubo nebst untersuchungen über das Ulcus molle," *Arch. für Derm. und Syph.*, 1894, vol. xviii. pp. 25 et seq.

ganglionic adenitis, which may be acute or chronic; 2, suppuration of one, more, or many ganglia and of the ambient connective tissue, while some ganglia still remain in a hyperplastic condition; 3, suppuration of the whole mass of ganglia and the formation of an abscess-cavity; 4, a chronic and mild combined hyperplasia and suppuration of the ganglia and of the connective tissue and skin, which becomes of a dull bluish or purplish color and the seat of sinuses and fistulæ: this is the so-called strumous bubo; and, 5, the chancroidal or virulent bubo, which may follow a chancroid or develop from an ordinary suppurating bubo which has been contaminated by dirt (pus-microbes perhaps).

Simple hyperplasia shows itself by enlargement of the inguinal ganglia and swelling of the parts, which may be of normal color or of a more or less deep red. Pain may or may not be present.

When one or more ganglia are the seat of suppuration, and others of hyperplasia, a red and painful swelling is found in the groin, and digital examination shows a combination of fluctuation, doughy sensation, and nodulation. This mixed form of bubo may be as large as an egg or even larger. The true suppurating bubo shows itself by a round or oval red and painful swelling which is much elevated and has an area of one to four inches or even larger, its long axis usually corresponding to the fold of the groin.

The so-called strumous bubo shows itself as a circumscribed or irregular inguinal swelling of a dull purplish color, considerably raised above the normal level of the parts and perforated by holes which show both undermining of the integument and the existence of sinuses leading down to inflamed ganglia. The clinical picture is very striking, and gives evidence of a chronic, sluggish, inactive cell-increase and suppuration, the pus of which is thin, sanious, and unhealthy. Patients having this form of bubo are usually persons of poor health and those broken down by excesses or as a result of poverty.

The chancroidal bubo gives evidence from the first of an actively destructive process. The groin becomes red and swollen, and a perceptible tumor is soon developed. The skin becomes red, tense, and the seat of much pain. Redness gives place to a brownish-red tint, and then the swelling, which is considerably salient, presents decided fluctuation. The abscess either bursts from ulceration of the skin or it is incised. The roof of this cavity, which consists of thinned and inflamed skin, then quite promptly melts away and the typical chancroidal bubo-cavity is left. This cavity is usually quite deep; its base is anfractuous, covered with sloughy tissue of a dirty-brown color, over which is a layer of unhealthy pus. The edges of this ulcer (since it really is one) are of a deep red, thickened, and decidedly undermined.

**Treatment of Buboës.**—Simple hyperplasia of inguinal ganglia may disappear by resolution. In some cases the daily application of tincture of iodine, combined with pressure, will effect a cure. Whenever the patient is particularly anxious for the speedy resolution of the swellings cantharidal collodion may be painted over them. This treatment, aided by the recumbent position, is sometimes very effective.

Where there are many ganglia the seats of a low inflammatory process which has not yet progressed to suppuration, resolution may be induced by injections of carbolic acid, according to the method of Dr.



M. K. Taylor,<sup>1</sup> who advocates the use of interstitial carbolic-acid injections in buboes and inflamed lymphatic ganglia generally. He injects from ten to forty minims of a watery solution of the agent of a strength of from eight to ten grains to the ounce. When used before the formation of pus he claims that he has not failed to arrest the morbid process. When pus has formed he evacuates the abscess by aspiration and throws in the carbolic solution. When the abscess-cavity is small he evacuates the whole of the contained pus; if large, only a part, and then throws in sufficient of the fluid to take its place. When spontaneous opening has occurred, the cavity has to be washed out with the same fluid and compression applied. Care is to be used to reach the centre of the tumor, and according to the author the needle should be thrust to the extent of two-thirds of the depth of the narrowest diameter of the tumor. The method has been used by him for seven years in nearly one hundred and fifty cases. It is claimed that by this method pain is much relieved and very little loss of time is incurred. Interstitial carbolic injections have sometimes been followed by surprisingly satisfactory results at my hands.

A method of treatment in the same direction—namely, the injection of an antiseptic solution—has recently been advocated by Welander.<sup>2</sup> His solution is made as follows: Benzoate of mercury, 1.0; chloride of sodium, 0.3; and distilled water, 100. Of this liquid one or more Pravaz syringefuls are injected into the most prominent part of the tumor. Welander claims great success for this treatment, and he is indorsed by Spietschka,<sup>3</sup> who gave it a good trial, which was followed by satisfactory results.

In all cases when these injections are made the parts must be rendered aseptic, and great care should be exercised in the technique of the injection.

When abortive measures fail in cases of inguinal ganglionic hyperplasia it is well not to temporize, but to resort at once to the radical operation of total extirpation. The operative field is shaved and rendered surgically clean; then a long, free incision is made parallel with Poupart's ligament and over the most prominent part of the swelling. It may be necessary also to make a vertical incision in order to have more space to work in. This vertical incision may be of advantage in drainage. When the parts are exposed all the glands, even if they are seemingly healthy, are to be dissected out. In this operation the surgeon may have to go down to and even between the femoral vessels. He should therefore work slowly and cautiously, taking out the ganglia with the handle of the scalpel or by means of his finger-nails. Parts should never be violently torn. The ganglia will be found to be firm oval masses as large as a bean and larger, and will be readily recognized when the operator has become a little familiar with the operation. All bleeding vessels must be tied. The wound when finished must be saucer-shaped, and should be well irrigated with 1 : 2000 bichloride solution.

<sup>1</sup> "The Abortive Treatment of Buboes and Lymphadenitis generally by Carbolic-acid Injection," *Am. Journ. Med. Sciences*, April, 1882.

<sup>2</sup> "Versuche einen Abortivbehandlung der Bubonen," *Arch. für Derm. und Syph.*, 1891, pp. 43 et seq.

<sup>3</sup> *Ibid.*, Ergänzungsheft, No. 2, 1892, pp. 63 et seq.

It is then packed with iodoform gauze, over which absorbent cotton and layers of bichloride gauze are held in place by a spica bandage.

Suppurating buboes may be treated by the old-time method of incision, followed by antiseptic irrigation and careful packing. The disadvantages of this method are that a long time is required in the healing of the parts, the dressings cause pain, and a compromising scar is left.

Within the past decade a method of treating suppurating buboes has been proposed and perfected, which I have no doubt will in a great measure replace all others. This method of treatment seems to have been first devised by Scott Helme,<sup>1</sup> and was most prominently brought forward by Fontan.<sup>2</sup> The active agent in this treatment is iodoform thrown into the abscess-cavity. The technique of the operation has been modified for the better by Dr. J. R. Hayden,<sup>3</sup> and it is his method which I use with much satisfaction and success in my hospital service. It is as follows:

1. The operative field is shaved and rendered surgically clean.
2. A few drops of an 8 per cent. cocaine solution are injected beneath the skin where the puncture is to be made.
3. A straight, sharp-pointed bistoury is thrust well into the most prominent part of the mass until pus flows.
4. All of the pus is forced out through this opening by firm but gentle pressure, as this procedure is, as a rule, very painful.
5. The abscess-cavity is irrigated with pure peroxide of hydrogen until it returns practically clear.
6. It is then irrigated with 1:5000 bichloride-of-mercury solution, all of which is carefully squeezed out.
7. The now thoroughly cleansed abscess-cavity is completely filled with 10 per cent. iodoform ointment by means of an ordinary conical glass syringe previously warmed in hot water, and a finger held over the puncture until—
8. A cold wet bichloride dressing is applied with a fairly firm spica bandage. The cold congeals the ointment at the puncture, and thus prevents its escape into the dressing.

The patient should be kept very quiet for the first twenty-four to forty-eight hours, in bed if possible, although this is not absolutely necessary.

The dressing should be changed at the end of three or four days. It is not often necessary to repeat the processes of irrigation, cleansing, and injection.

Though it has been claimed that buboes are cured by this method in six or eight days, the time occupied is usually between ten and twenty-one, which may be said to be an excellent showing. Besides this advantage, there is no necessity for painful applications or dressings, and the scar left is usually so small that it is necessary to look for it very closely in order to find it.

The treatment of the so-called strumous buboes should be radical and thorough. The parts are shaved and rendered as nearly as possible surgically clean. Then a long free incision in the course of Poupart's ligament is made, and, if the bubo is large, is crossed at its middle by a smaller vertical incision. Then the ganglia and the affected tissues are

<sup>1</sup> *Chicago Med. Journ. and Exam.*, Sept., 1886, vol. liii., No. 3.

<sup>2</sup> "Guérison rapide des Bubons par l'Injection de Vaseline iodoformée," *Arch. de Méd. Navale*, 1889, vol. lii. pp. 5 et seq.

<sup>3</sup> *American Journ. Med. Sciences*, Nov., 1895.

carefully but thoroughly removed in the manner already described. All the bluish, thickened integument should be cut off with the scissors, and care should be particularly exercised that any sinuses in the skin should be excised. The wound is then antiseptically treated.

Dr. F. S. Watson<sup>1</sup> has published an essay in which he states that by means of excision and most thorough antiseptic measures he has been able to get union by first intention in 10 out of 20 unselected cases of buboes of all kinds, in all but 4 of which the overlying skin was inflamed, and in some necrotic. The following rules were followed: 1, to remove all diseased tissue, and to leave as far as possible a perfectly healthy surface in every part of the wound (to secure this it is always necessary to carry the dissection down to the fascia covering the abdominal muscles; sometimes to expose the femoral vessels, and generally the external inguinal ring); 2, to excise such portions of the skin as threatened to become necrotic or had already become so; 3, to curette the under surface of the skin-flaps; and, 4, to thoroughly swab the whole wound with dry sterilized gauze-sponges or sponges wet with a solution of corrosive sublimate, 1:4000.

In carrying out this operation Watson makes a crescentic cut "carried well below the area of inflamed skin through the healthy skin. From this line a flap is dissected up, extending to a line well above the diseased glands and exposing them thoroughly. After their removal the flap is turned down and its edge sutured on the line of the first incision." Drainage may be made by means of sterilized strands of silk passed through an opening below the line of the incision. The second incision used is a long one parallel with Poupart's ligament, and an elliptical piece of skin corresponding to the site of the ganglia is dissected off, and then the edges of the wound are sutured.

It may be said of this radical operation that it will certainly leave very large and very much depressed scars, corresponding to the amount of tissue which is removed. It has been found in this method, moreover, that the suppurating process sometimes burrows away from the part operated on, and that a very severe condition of abscess is produced.

Chancroidal bubo may in its early stage, when suppuration has taken place and when the skin is not much involved, be successfully treated by the iodoform-vaseline method, which will sometimes bring about a cure even where the skin is thinned and reddened. This treatment should always be used in appropriate cases of chancroidal bubo.

If in this form of suppurative adenitis the skin is much destroyed, particularly if perforation has occurred, the long inguinal incision should be made in most rigid antiseptic conditions, and the abscess-cavity should be thoroughly cleansed by curetting, by the removal of all diseased ganglia, and by the copious irrigation of hot bichloride solution, 1:2000. The wound should then be dusted with iodoform and packed with gauze, well covered with gauze and absorbent cotton, and the whole should be well retained by a spica bandage. In these cases it may be necessary to remove the dressing and to freely irrigate the wound with the bichloride solution once or perhaps twice a day. When granulations begin to appear, balsam-of-Peru gauze may be used instead of iodoform dressing.

<sup>1</sup> *Journal of Cutaneous and Gen.-urin. Diseases*, vol. xi., 1893, pp. 45 et seq.



## PART III.

### SYPHILIS.

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#### CHAPTER L.

##### GENERAL CONSIDERATIONS AS TO ITS NATURE, EVOLUTION, AND COURSE.

SYPHILIS is a chronic infectious disease which begins in a local lesion, which lesion is caused by some morbid secretion or virus or the blood derived from a previous syphilitic person. Beginning thus as a local infection, it promptly invades the whole organism, more especially its connective tissue, induces inflammatory processes of a low grade, and gives rise to a low form of cell-growth called granulation tissue. Syphilitic inflammation, when uncomplicated, does not produce pus. It is therefore a chronic granulation-tissue disease of protracted and irregularly intermittent course, which in some respects resembles leprosy and tuberculosis, but which in many points differs from them, particularly in the matter of the initial lesion, which the latter diseases do not seem to have, or at least it has not as yet been found in either.

Syphilis pursues a **course** peculiar to itself. In its early stages it presents points of resemblance in its evolution and course to the exanthemata and to diphtheria, but here, again, many features are absent which are necessary to make the simile complete. Syphilis originates in a fixed and visible infectious secretion; the exanthemata likewise originate in a volatile or fixed infection; they have periods of incubation—syphilis two, the exanthemata one—which are followed by constitutional disturbance and fever, syphilis in this feature being comparatively mild. Further, they all have extensive integumentary and mucous-membrane lesions, which in the exanthemata are always inflammatory during their whole course, while in syphilis they are moderately hyperæmic and essentially proliferative. Here is a radical point of difference: the exanthematous eruptions are simply inflammatory, and if cell-proliferation occurs it is of a simple nature, a mere increase of the normal cells. The opposite occurs in syphilis: the inflammatory process is less active, and always results in infiltration of new cells entirely foreign in their nature. In diphtheria there is a demonstrable micro-organism which attacks the system in one spot, usually the throat, and exceptionally in other regions. From this local infective focus general constitutional symptoms are developed, such as fever, headache, pains in bones and joints, neuralgias, paralyses, albuminuria, and, in some cases, generalized exanthemata. Thus syphilis resembles diph-

theria in its local origin, its systemic poisoning, its peripheral paralyses, its infectious nephritis, and its dermal rashes.

Syphilis is really a disease of such protean aspects that in some of its very numerous phases it presents points of resemblance more or less strong to almost every other morbid condition or disease. Indeed, the metamorphoses of syphilis are infinite. Reasoning analogically, with the features and pathological nature of leprosy, tuberculosis, the exanthemata, and diphtheria in mind, one is forcibly impressed with the view that syphilis also is a disease of microbic origin, but, striking as is the probability, the facts in our possession to-day do not warrant us to go as far as some authors do who unhesitatingly call syphilis a disease of bacterial origin. A number of observers have found in active and early syphilitic lesions certain micro-organisms which have been revealed by delicate staining methods, but their numbers have been small, their presence not absolutely constant, and, furthermore, no cultures have been made, and consequently inoculation-experiments have not been tried.

In the wide range of infectious diseases we uniformly observe local symptoms due to the microbes, and general symptoms resulting from intoxication produced by the poisonous secretions or toxines developed by them, and various and varied tissue-changes. Now, in syphilis it is very probable that the initial lesion with its textural peculiarities is the result of the action of certain specific virulent microbes. With the development of the lesion it is, reasoning on analogical evidence, not doing violence to probability to suppose that from this original infectious focus a diffusible poison is proliferated which gives rise to such fugitive and ephemeral affections (usually irritative) as meningeal hyperæmia, disturbances of the reflexes, erythematous rashes, icterus, and pains in the muscles, bones, joints, and fasciæ. The fever, the debility, the nervous disturbances, the anæmia and chlorosis from malnutrition, and the underlying changes in the blood, diminution in the proportion of its solid elements and the increase in the number of leucocytes,—all these point to the existence of an intense microbic poison which has been diffused throughout the system. Superadded to these constitutional manifestations there are the many cell-changes which syphilis always gives rise to. In our advanced state of knowledge we can only explain these complex morbid conditions and processes—since they resemble very closely, and even exactly, similar ones in other diseases in which the existence of a bacterium is absolutely certain—by assuming that they are the result of a *virus animatum* the micro-organism of which is unknown to us.

Whatever may be its origin, syphilis is a disease *sui generis*, which stands out prominently in pathology as a distinct succession of correlated morbid processes which may resemble many or all other morbid processes and diseases in part or in whole, but which is essentially different from them all. There is no etiological relation whatever between syphilis and chancre. Syphilitic lesions and syphilitic integument and mucous membranes may be the seat of invasion of pus-microbes which produce in them lesions identical to the eye with the chancre, but these are merely local accidents not in any manner related etiological to the syphilitic process. They are simply evidences of the

vulnerability of the tegumentary tissues of syphilitics to invasion by pyogenic organisms.

There are two clearly-defined forms of syphilitic infection—the one called the acquired form, which begins in a local or primary lesion, the hard chancre, and the other the hereditary, incorrectly called the congenital, form, in which there is no local primary lesion, the disease usually beginning with general manifestations. In the acquired form the infection is derived from a person previously infected in whom the disease is active. In the majority of cases syphilis is contracted in the sexual act, and for this reason this disease is classed among the venereal diseases. It is then syphilis of genital origin. There are, however, many instances in which syphilis is not contracted in coitus—for example, from kissing a syphilitic, by inoculation in operations upon and examinations of syphilitics, and from contamination from any article which by some means or accident may be smeared with the syphilitic virus. These latter forms are termed cases of extragenital syphilis, and from the fact that in most instances there is no moral transgression or erotic origin in their causation, they are classed under the category of *syphilis insontium*, syphilis of the innocents or unmerited syphilis.

Acquired syphilis is never developed spontaneously: its virus enters the organism at the point of infection, and always begins with the development of a local lesion called the chancre, the hard or Hunterian chancre, the infecting chancre, the initial sclerosis, the initial lesion, the primitive neoplasm, and the primary lesion. No attention whatever should be paid to cases called *syphilis d'emblée*, in which it is claimed that syphilis began without an initial lesion. As Ricord graphically remarks, "Syphilis never invades the organism without causing its gap (*trou*); it always has a port of entry. This gap, this port of entry, is the accident of contagion (initial lesion), which is the prelude to all the others, which is always separated from them by an interval more or less long, and which is the indispensable exordium of the disease."

Syphilis, therefore, is communicated to the healthy person by means of the secretions of a person suffering from that disease, and the first evidence of the infection is shown in the initial lesion. Mankind<sup>1</sup> alone seems susceptible to the action of the syphilitic virus, since experiments upon animals have clearly shown that they are immune to it.

Hereditary syphilis is that form in which the infection is derived from one or both parents who are the victims of an active state of the disease at the time of conception. It is very doubtful whether true syphilis can be transmitted to the child during gestation, particularly at its late period.

For purposes of clinical description and for various therapeutic considerations it is well to preserve Ricord's division of the disease into three periods—the primary, the secondary, and the tertiary. The primary period or stage of syphilis is divided into two parts, called periods of incubation. The first period of incubation is the time which elapses between the infecting coitus or contamination and the appearance of the hard chancre. The second period of incubation includes the interval of time between the appearance of the initial lesion or chancre and the evolution of secondary manifestations. The secondary stage occupies

<sup>1</sup> Vide *infra*.



the first year or two, in which the lesions are generalized, rather superficially seated, and of tolerably mild nature and course. The tertiary stage begins at the expiration of two years, and perhaps in some cases earlier, and is peculiar in the fact that its lesions are, as a rule, more localized and circumscribed, but are deeper-seated and of a more severe character.

Though this division is oftentimes chronologically incorrect, and though anatomically there are many exceptions to it, it is the best we have, and it can be put to a good purpose as a working clinical basis when its shortcomings are clearly known. Ricord's division assumes a uniform methodical and progressive course and development of the disease, which, however, may be observed in some cases and is wanting in others.

The mode of development of syphilis in its primary period is peculiarly orderly and slow, is unattended with any striking features, and is nearly always quite regular in its course and chronology, so that tolerably clear lines may be laid down concerning it. After the infecting coitus or contamination of the subject nothing is usually to be seen of the impending infection for some time. It sometimes happens that pus-infection occurs synchronously with the syphilitic infection. In such a case a chancre appears in a day or two, and it may continue to exist up to the time of the appearance of the syphilitic chancre or it may be cured before that event. In somewhat rare cases herpetic vesicles appear just after coitus upon the spot on which later on the chancre appears. In like manner traumatisms, such as fissures and excoriations, may show themselves quite promptly, but these are only accidents.

It must be remembered that there is no haphazard about the development of the chancre. Wherever the poison has been implanted there the initial lesion develops. As Ricord so brightly and happily says: "In the case of syphilis the person is first punished where he has sinned. If the penis and it alone has been exposed, it is on the penis that he is hit. If the exposure has been by the mouth or the anus, it is upon the mouth or the anus that the first accident (initial lesion) manifests itself. Look at the case of nurses: they are exposed at the breast, and it is there that they are first affected."

The disease always begins at the infected part, which is commonly the genital organs. In somewhat rare cases two parts of the body may be infected at the same time. Thus we find the initial lesion of the penis not very infrequently coexistent with a similar lesion on the lip or the face or the finger or other parts of the body. These cases are classed under the head of *chancre à distance*.

In many cases the secondary stage is quite regular and the morbid processes develop themselves superficially and in mild form. Then in due time (the disease for any reason being progressive) tertiary symptoms show themselves, and we have an orderly and tolerably systematic evolution of syphilis from the primary through the secondary to the tertiary stage. But in many cases there is a want of uniformity of evolution, for lesions of a tertiary character appear precociously; they may coexist with secondary lesions, and not infrequently after the precocious appearance of tertiary lesions those of the secondary period show themselves. While, therefore, it is often impossible to draw sharp

lines of difference between a secondary and a tertiary stage, we can hold fast in most cases to the following course in our clinical studies and in regulating our therapeutics—namely, to consider superficial lesions of the skin and mucous membranes and various systemic symptoms and conditions known to be of early development as evidences of the secondary period and claiming an appropriate treatment, and to look upon deep-seated lesions of the connective tissues and those of bones and viscera as belonging to the tertiary period and requiring treatment for advanced stages.

The general symptoms of syphilis usually make their appearance with a great degree of order and regularity. This fact is most apparent in those lesions which follow immediately upon the secondary period of incubation, and which vary but little in different subjects. Allow any patient with a chancre to go without treatment, and it may be predicted with almost absolute certainty that within three months he or she will be attacked by the following category of symptoms with but little variation—viz.: general lassitude, accompanied by headache and fugitive pains in various parts of the body; alopecia; an eruption of erythematous patches or papules upon the skin; pustules upon the hairy scalp; enlargement and induration of the post-cervical glands; and milk-white or granular patches, which may become hypertrophied or ulcerated, upon the mucous membrane of the mouth, anus, or vulva.

Subsequent to the first outbreak of general syphilis the same uniformity does not prevail, and certain symptoms are absent in one case and present in another, or they appear to be modified by the constitution of the patient, the hygienic conditions in which he is placed, his habits, and especially by treatment. But if we take a number of cases, some of which supply what is wanting in others, we find that we can, as it were, make up a complete series, in which the symptoms progress by a regular gradation, and may be divided into two classes distinguishable by the time of their appearance, their character, and their seat. Those of the first class follow immediately upon the earliest general symptoms before mentioned, with which they are evidently identical in character. Those of the second class, as a rule, do not occur until after a certain interval which experience enables us to determine with great precision. Again, the order of the two classes is never reversed. For instance, a patient who has been suffering with symptoms belonging to the third period, as deep tubercles of the cellular tissue or caries of the bones, is never known to exhibit the premonitory fever, exanthematous eruption, and other early symptoms of the second. The disease progresses with greater rapidity in some cases than in others, yet, owing to the general uniformity referred to, simple inspection of a patient will enable any one familiar with its natural course to arrive at an approximate conclusion as to the length of time that has elapsed since contagion, and also as to the character of the preceding symptoms, unless these have been altogether suppressed by treatment.

Apparent exceptions to the regular succession of the general symptoms of syphilis are met with, and may readily deceive an inexperienced observer. One of the most frequent of these is due to treatment. It often happens that a patient had a chancre many years ago, and perhaps early secondary symptoms, for one or both of which he took mercurials;

a long period has since passed without further general manifestations, but his system has continued under the influence of syphilis, which finally becomes active again and gives rise to tertiary lesions. Evidently the exemption from late secondary symptoms in many cases may be ascribed to mercury taken early in the evolution of the infection.

Again, the date of the first appearance of any lesion determines its position in the syphilitic scale, while its persistency may be due to many causes too numerous to mention. It is a very common occurrence for a chancre to remain until secondary symptoms break out, but we do not therefore conclude that both belong to the same order. In the same way, secondary manifestations are, in some exceptional cases, present long after tertiary have supervened. Instances of this coexistence of secondary and tertiary lesions are seen in cases of relapsing papular eruption, mucous patches, serous iritis, cephalalgias, neuralgias, and affections of fibrous and serous tissues.

Many syphilitic lesions, and particularly eruptions upon the skin and mucous membranes, may, either with or without treatment, disappear, and again return within a limited period with the same characters as at first. This tendency, however, as a rule to which there are many exceptions, ceases with time, and relapses after a considerable interval are in all cases rare. For instance, syphilitic erythema, which usually appears about six weeks after the development of the chancre, may perhaps return as late as the eighth or ninth, and, it has been claimed, the eighteenth, month, but never several years after the chancre. Cases of so-called tertiary erythema have been reported, but their relation to syphilis has not generally been well made out. Much further observation must be made before we are warranted in stating that there is such a definite morbid entity as tertiary syphilitic erythema.

Then, again, we not infrequently see cases in which gummata and tubercular syphilides relapse for many years, and they always preserve their characteristic individuality in each outbreak. In other cases these dermal lesions are followed at varying intervals by eye, bone, testicular, and visceral lesions, and perhaps with skin lesions of a different character.

With the expiration of the second period of incubation, or that of local manifestations, the *secondary stage of syphilis*—or, as it is called, *the stage of general or constitutional manifestations* or the condylomatous stage—begins. In this stage, as a rule, the lesions are superficial, and confined largely to the skin and mucous membrane, consisting of erythematous, papular, and pustular rashes. The duration of the secondary period of syphilis cannot be definitely stated, since it depends largely upon the condition of the constitution and the habits of the patient, and also upon the fidelity with which he follows treatment. In the vast majority of cases—certainly in those in which there is no organic trouble—syphilis proves a very tractable and curable disease, provided patients will follow treatment in a careful and systematic manner during a sufficient period of time. If this is done, the disease may end with the secondary stage, the patient thereafter remaining healthy.

The tertiary stage of syphilis is seen to-day in America much less frequently than formerly, owing very largely to our improved modes of treatment. Indeed, if cases of tertiary syphilis are critically, but in an unbiassed manner, examined, it will be found that in the majority the



long-drawn-out course of the disease is, in most instances, due to neglect of or indifference to treatment, or to the baneful effects of alcohol. In a small proportion of cases, however, the disease takes a firm hold on the patients whose tissues seem to be particularly vulnerable to it, and in such cases the usual beneficial results of treatment are slow in making their appearance. This form is called malignant syphilis.

The severity of the symptoms produced by syphilis on its first appearance in the latter part of the fifteenth century, compared with its greater benignity at the present day, affords some ground for believing that the infection is slowly but gradually losing in intensity, in the same manner as the vaccine virus becomes weaker after many successive removes from the cow. This fact was noticed by Astruc in the middle of the last century, who says: "Whatever might formerly be the power and efficacy of the venereal disease when it was new and in vigor, while the undivided poison violently effervesced, there is nothing like it, I imagine, to be feared from it now, as it is weakened, become old, and its force nearly spent."

It was at one time erroneously supposed that the first manifestations of syphilis might make their appearance at any period subsequent to infection and to the development of the initial lesion; hence, that a man who had once contracted a chancre was never safe, no matter how long a time had been passed without any further evidence of the disease. It is now known that if general manifestations are ever to appear they will show themselves within the comparatively limited period just specified.

In a series of 120 cases observed and tabulated by me the shortest period of incubation was in one case thirty-five days, and the longest eighty-two in one case, whereas in the majority the general manifestations appeared within forty and fifty days. This general average is in accordance with the results of observation by Bassereau, De Méric, Fournier, Sigmund, Ricord, and others.

The testimony derived from artificial inoculation (which has the advantage that all the steps of the process are under the direct observation of the surgeon) is essentially the same. Thus, in 12 cases of inoculation of the secretion of a chancre, the mean length of the second period of incubation was forty-eight days; in 14 cases, in which the secretion of various lesions of the skin and mucous membranes was employed, it was forty-five days; in 4 cases, however, in which the matter was taken from pustules, it was eighty-two days. The second period of incubation was also prolonged in the case of experimental inoculation with syphilitic blood.

The practical conclusions to be derived from the foregoing facts are as follows:

1. It is advisable in all ulcers of a doubtful character to defer general treatment and keep the patient under careful observation until the time for secondary symptoms to appear is passed.

2. A venereal ulcer which is not subjected to specific treatment (so called) will usually, if at all, be followed by secondary symptoms within fifty days, and always within six months.

3. The earliest symptoms of general syphilis (except in cases of hereditary origin) have been preceded by a chancre, probably within fifty days, and certainly within six months.

To recapitulate: The primary stage of syphilis begins with the act of infection, in which the virus is deposited upon some portion of the body, genital or extragenital. In the vast majority of cases no evidence of this accident is seen, and, owing to various causes, such as promiscuousness of sexual contact, indifference, and failure of memory, in many cases no precise data can be obtained concerning it. From the date of infection a period of time elapses before any visible manifestation of syphilis shows itself, which is called *the first period of incubation*. Clinical observations and experimental inoculations enable us to say that the duration of this period may be, in very exceptional cases, as short as ten days and as long as seventy days. I myself have seen undoubted instances of sixty and seventy days' primary incubation. In general, however, the average will be found to be between twelve or fifteen and twenty-one days. At the expiration of this time the hard chancre or initial lesion of syphilis shows itself.

With the appearance of the hard chancre *the second period of incubation of syphilis* begins, but not the secondary stage of the disease. This period is rather more regular than the first period of incubation, and lasts usually about forty or forty-five days, sometimes as long as sixty, and very exceptionally seventy and ninety days. Cases of longer incubation than just stated should be received with much caution and the elements of fallibility carefully probed. The length of the secondary period of incubation may, to a certain extent, be modified by influences which may govern the circulation, such as heat and alcoholics. In general, in hot weather the end of the secondary period comes quite promptly, while in cold weather it may be delayed. In weakly, thin, and anæmic subjects the second period may be much prolonged. I recently waited for the evolution of secondary manifestations in a cadaverous young man for eighty-two days before they appeared. In the case of a man forty-three years old the first period of incubation was twenty-one days. On the forty-seventh day of the second period of incubation he was attacked with severe pleuro-pneumonia, which lasted thirty-one days, and on the day following severe general syphilitic manifestations showed themselves. In this case, therefore, the secondary period of incubation was seventy-eight days.

The morbid phenomena observed during this period of incubation are the development and growth of the initial lesion or chancre, and the enlargement of the inguinal ganglia in immediate anatomical connection, which becomes appreciable sometimes as early as the fifth day, but usually from the seventh to the tenth. In some cases there is an induration of the lymphatic vessels leading from the chancre to the ganglia. This lymphatic hyperplasia goes on slowly and painlessly until the ganglia become much enlarged. These two periods of incubation, the primary and the secondary, constitute the first or primary stage of syphilis, which may occupy in its evolution from sixty to ninety days, rarely longer. The disease, then, may said to have become fully developed, and at this date general systemic manifestations and symptoms appear which constitute what is called secondary syphilis.

While, in general, syphilis runs a mild course, its gravity should never be underestimated. On this subject I can do no better than to quote in full Fournier's graphic, eloquent, and in every way admirable

exordium as to the necessity of appreciating the nature and of treating syphilis (which, by the way, is one of the most trenchant passages in syphilographical literature), for the reason that some may be led astray by the specious arguments of those who claim syphilis to be a disease of decided benignity. He says: "Is it or is it not necessary to treat a syphilitic patient? Is it or is it not beneficial that he should be treated? In order to answer a proposition thus stated, let us consider what risks such a patient runs, by stating his condition clearly. To what dangers, in fact, is he exposed? Let us set forth his pathological balance-sheet, if I may speak thus—a balance-sheet which, if not certain and inevitable, is at least probable and possible. What can such a patient have? What lesions is he liable to develop some day or other? And these lesions, are they of such a character that it will be urgent or advantageous that they should be treated? What he can have are at first lesions without any real gravity, but which are at least very disagreeable to some, particularly if they are visible: thus he may have cutaneous syphilides of various forms, very annoying syphilides of the mucous membranes, engorgements of the ganglia, alopecia, and onyxia. In the second place, there are more serious lesions, from the fact that some of them are very painful: they are angina, cephalalgia, various pains with nocturnal exacerbations, insomnia, myalgia, pain in the joints, inflammation of tendons, periostitis, etc. Should not the possible anticipation of such troubles justify the intervention of treatment? But we have really a third order of lesions, which are much more serious and which may involve and compromise important organs. Only to cite the most common of this group, we shall find affections of the eye, such as iritis, choroiditis, and retinitis, which are capable of impairing or even extinguishing vision; sarcocele, which may induce disorganization and atrophy of one or both testicles and thus produce impotence; gummy tumors, which often perforate and destroy the velum palati and leave a double and revolting infirmity; paralyses of the eye and face; hemiplegia and paraplegia; inflammation of bone, caries, ozæna, flattening and loss of the nose; without speaking of the possibility of hereditary transmission and of the introduction of syphilis into the family circle. But this is not yet all. If we consult a manual of pathological anatomy, we shall find there described fatal lesions attributable to syphilis alone. The causes of death in syphilis are many and varied—death by hepatic lesions, cirrhosis, and hepatitis gummosa; death by lesions of the meninges; by cerebral gummata and syphilitic encephalitis; by lesions of the spinal cord, which are more common than is generally believed; by exostoses of the cranium and vertebra; by lesions of the kidneys, of the larynx, and of the lungs; and, more rarely, by lesions of the œsophagus and rectum; death by consumption and progressive cachexia. These are, in short, the possible consequences of syphilis, and such is the perspective offered to a person who contracts this contagion. Dare we call a disease benign which can end thus? Can a disease be called benign which is fraught with such serious accidents and whose pathological anatomy is so rich and varied? Dare we tell persons afflicted with this disease to leave it untreated, to let things go, and to wait patiently the possible results of such an infection, without warning them of it?"



## CHAPTER LI.

## PATHOLOGY OF SYPHILITIC INFECTION AND OF THE SYPHILITIC PROCESSES.

CONSIDERED structurally, syphilitic inflammation is in many respects similar to tubercular inflammation, and the lesions of syphilis viewed as a whole resemble tuberculosis morphologically more closely than any of the other classes of inflammation. In all probability, syphilis is also due to the presence in the body of some form of bacterium which yields a specific form of toxine as a largely instrumental factor in producing some of the syphilitic manifestations.

The presence of such a bacterium, however, is still entirely hypothetical: we do not know with certainty of any such organism, and the bacillus occurring in small numbers in syphilitic lesions, described by Lustgarten, furnishes no evidence of being causally associated with the disease. This alleged bacillus of Lustgarten has never been isolated and cultivated on artificial media or subjected to inoculation-experiment, nor has this discovery of Lustgarten received any special corroboration. The analogy, however, which syphilis bears to other specific or infectious diseases in which the bacterial origin is quite thoroughly known furnishes, as we have already seen, strong reasons for believing in a similar cause for syphilis.

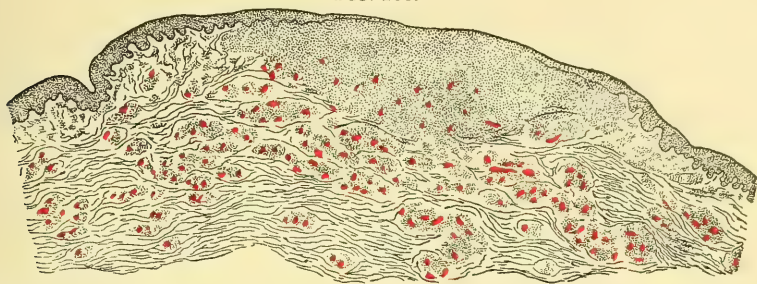
With the exception of the formation of gummata, the characteristic feature of the secondary and tertiary periods, and an early and persistent involvement of the blood-vessels throughout the whole course of the disease, the lesions of syphilis are not essentially distinctive. In addition to these two characteristic lesions of syphilitic inflammation, a third and rather deeply-rooted tendency exists to the production of new connective tissue, especially in the central nervous system in the late stages of the disease, sometimes years after the invasion of the primary sore. This late production of connective tissue is a slow, persistent, gradually progressive process, and many of the scleroses of the nervous system—such as *tabes dorsalis*, for instance—may be ascribed to the poison of syphilis. Whether this late and chronic production of connective tissue in the nervous system is due to some inherent property of the syphilitic virus, stimulating the connective-tissue cells directly, or whether the new tissue grows as a result of the tendency of syphilis to damage the blood-vessels, is not definitely determined.

Beyond these three more or less distinctive traits of syphilitic inflammation—viz. the gummy tumor, the persistent involvement of the blood-vessels, and the late and gradual production of new tissue in the central nervous system—the general lesion of the disease is the occurrence of more or less circumscribed tissue, which consists of small round cells, or of these mingled with larger polyhedral cells, or occasionally giant-cells. This is the tissue which is found in the earlier stages of the disease in the initial sores, papules, tubercles, and condylomata.

This newly-formed richly cellular tissue, occupying large or small areas, may be circumscribed or spread out more diffusely, especially in

the mucous membranes. These foci, as a rule, contain few blood-vessels, and tend to undergo coagulation-necrosis, and to disintegrate at their

FIG. 188.



Showing the chancre (at the right upper part) and small vessels with the coat-sleeve arrangement of the cell-infiltration in the deep connective tissue under and beyond the chancre. (Vessels represented by red dots in Figs. 188 and 189.)

centres. Finally, they may be converted into cicatricial tissue. The blood-vessels near these inflammatory foci frequently have swollen or pro-

FIG. 189.



Showing the coat-sleeve arrangement of the cell-infiltration in the skin, far away from the chancre, which part to the eye looks healthy.

liferating endothelium and infiltrated walls. Later on the blood-vessels may become diseased independently by chronic processes. They may

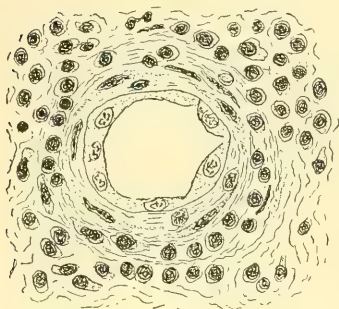
become subject to thickening or obliterating endarteritis, or otherwise undergo extensive changes.

In the primary lesion or *chancre* there is a small round-celled infiltration of the connective tissue, proliferation of the connective-tissue cells, and an abundance of leucocytes. (See Figs. 188 and 189, from a section of a chancre of the prepuce of four days' duration.) A chancre also shows more or less necrosis or degeneration of its constituent cells. An uncomplicated chancre in its early stages is really quite identical in its general structure to a small superficial ulcer or patch of granulation, except, however, in the chancre there is distinctly more necrosis and degeneration of its constituent small spheroidal cells.

The blood-vessels surrounding the chancre, as well as those some considerable distance from the chancre, even in its earliest stages of development, are quite uniformly changed. (See Figs. 190 and 191.) The endothelial cells

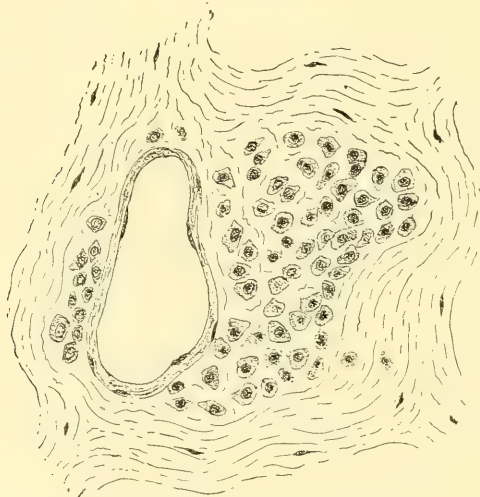
are swollen or proliferating, the walls of the vessels may be infiltrated (Fig. 190), and, finally, the perivascular spaces are crowded with proliferating polyhedral cells (Figs. 189 and 190).

FIG. 190.



A small artery taken from a section of the tissue depicted in Fig. 188, more highly magnified. Both the middle and outer coats of the vessel are infiltrated with small round cells. The lining endothelial cells are also swollen.

FIG. 191.



A vein just below the bed of the same chancre shown in Fig. 188. The lymph-space about the vein is distended with polyhedral cells.

While this condition of the blood-vessels may be found associated with other forms of inflammation, especially when the vessel is directly in the path of an advancing inflammation or lies on the border-line of the nor-



mal tissue, in a chancre the extensive distribution and early involvement of the vessels are peculiar and characteristic. The extensive distribution of the perivascular changes, their topographical arrangement, and early involvement in regions slightly beyond the chancre are the striking features in the initial sore, rather than any peculiarity of the structure of the lymph-space lesion.

There are, however, certain stages in the development of chancroid in which the perivascular spaces leading from this form of sore exhibit a similar condition, and, like the vessel-spaces in syphilis, seem to be propagating a virus to the inguinal lymph-nodes.

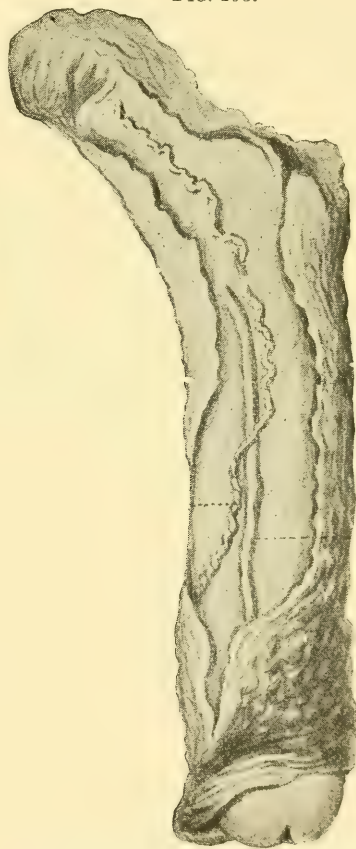
Thus, whatever the causal agent of syphilis may be, it very soon

FIG. 192.



Showing dorsal vein of penis, which is the seat of early peri- and endophlebitis (chancre near glans).

FIG. 193.



Same as Fig. 192. The large cords represent the veins, the more tortuous ones the lymphatics.

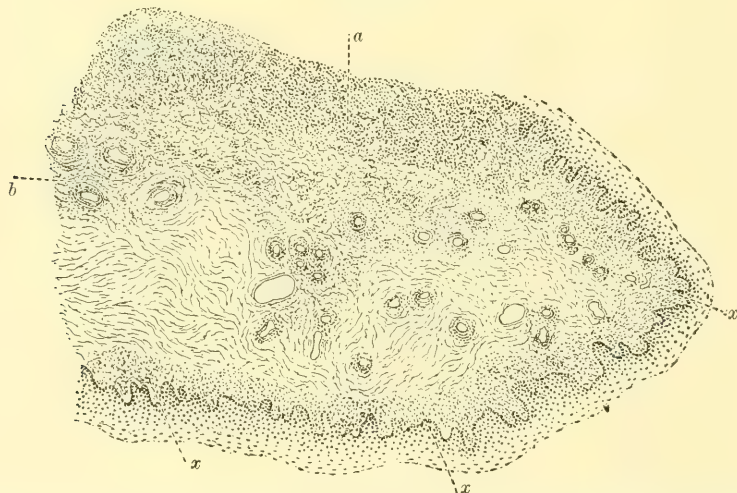
reaches the perivascular spaces and travels along these, or it initiates a proliferation of cells in the lymph-spaces about the vessels, which rapidly propagates and extends along these spaces to more distant parts of the body.

This early and extensive lesion of the lymph-spaces about the blood-

vessels, especially the smaller veins, enables us to understand more definitely how the virus of syphilis spreads, how it travels along these lymph-spaces, accompanying the vessels to the root of the penis, to the first set of lymph-nodes which such a set of perivascular lymphatics communicate with—namely, the inguinal ganglia. From these inguinal nodes the cell-proliferation, in response to the syphilitic virus, is propagated, it would seem, to the lymph-nodes in general throughout the body in greater or less extent, and in this way the general adenopathy is established. The plates of Külneff<sup>1</sup> (Figs. 192 and 193) of St. Petersburg are especially instructive in this connection, and show this extension of proliferating cells along the perivascular lymph-spaces from the primary sore to the inguinal lymph-glands. Both of these figures illustrate the so-called lymphatic cord of syphilis, which is really nothing more than an extension, along the lymphatics of the larger veins, of the same process in the terminal and peripheral perivascular lymphatics surrounding the chancre, already shown in Figs. 188, 189, and 190.

Finally, in regard to this extension of syphilis through the perivascular spaces from the primary sore to the inguinal glands, it may be pointed out that it occurs very early and proceeds with great rapidity. As soon as the chancre appears the network of peripheral perivascular lymph-spaces is already involved, and, as indicated by the line of pro-

FIG. 194.



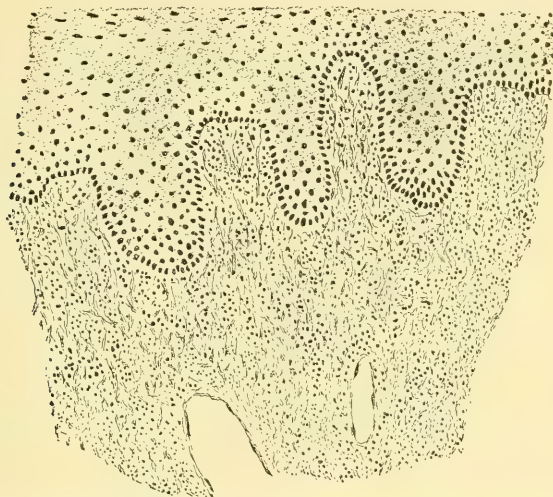
From a section of a chancre of the prepuce at the twentieth day from its first appearance. The indurating edema corresponds to a distention and infiltration of the upper layers of the derma which extends as a zone, *x, x, x*, about the centre of the chancre at *a*. The infiltration of the walls of the vessels is also well exhibited, especially at *b*.

liferating cells along the venous lymph-spaces, the virus is already on the path to the inguinal lymph-nodes. It can be seen, therefore, that it is impossible to stay the course of syphilis by excising the chancre. Not only the chancre, but all this chain of venous lymph-spaces communicating with the inguinal lymph-node, would also have to be removed to interrupt the syphilitic infection of the body.

<sup>1</sup> "On the Question of the so-called Lymphangitis in the Early Stage of the Primary Syphilitic Sclerosis," *Inaug. Dissert.*, 1889.

The stage of *induration* or *indurating œdema* remains to be considered in describing the structure of a chancre. If a chancre at the well-pronounced stage of induration be examined microscopically (Fig. 194), it will be seen that the semi-necrotic mass of small spheroidal cells (Fig. 194, *a*) composing the bed and main bulk of the ulcer is circumvallated by a zone of œdema and cellular infiltration of the papillary portion of the derma (Fig. 194, *x, x, x*). Indurating œdema, then, as the name implies, is a wall about the chancre wherein the interfibrillary spaces of the *pars papillaris* are distended with fluid and small round cells (Figs. 194 and 195).

FIG. 195.



From a portion of the section corresponding to Fig. 194, more highly magnified. The interfibrillary spaces of the upper layers of the derma are distended with fluid and small round cells.

To recapitulate briefly the series of changes in a chancre: When the causal agent of syphilis, presumably some form of bacterium, enters through the skin or mucous membrane, it excites local leucocytosis and exudative inflammation, with more or less necrosis; there are also proliferation of the connective-tissue cells, a propagation of proliferating cells along the perivascular lymph-spaces, and later a wall of infiltration and œdema of the upper corium layers formed about the periphery of the ulcer corresponding to the stage of indurating œdema. Finally, the sore tends to heal and become converted into scar-tissue.

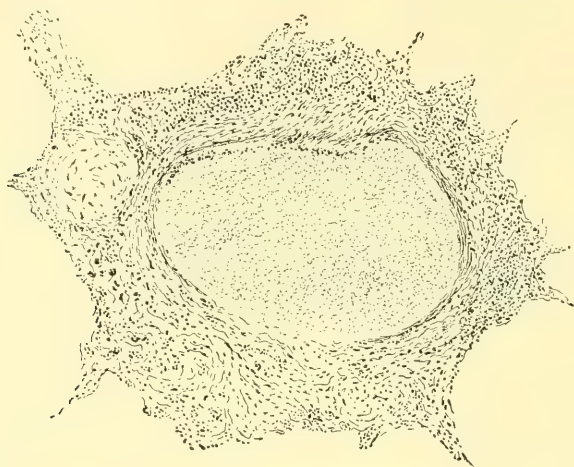
Following the initial sore there may be inflammation of the lymph-nodes, of the skin and mucous membranes, of the bones, and of several viscera, which are structurally similar in each case.

Although not confined strictly to the secondary stage of syphilis, the *gummy tumors* or *gummata* form the distinctive feature of this stage, and, structurally, are characteristic of syphilis. A small gumma consists of a mass of small spheroidal and epithelioid cells, and occasionally giant-cells. Small gummata may resemble miliary tubercles so closely that from microscopical appearances alone it is difficult to distinguish them apart. The larger gummata have rather characteristic gross appearances: to the



naked eye they appear as grayish-white, rather firm, spherical nodules; they generally have a firm, cheesy centre and a translucent pearly capsule merging into the surrounding tissue. In structure such a gumma has a granular necrotic centre surrounded by a connective-tissue envelope, which is generally infiltrated with small round-cells and sends off prolongations into the surrounding tissue, so that when situated in the viscera the gumma is quite sharply circumscribed. (See Fig. 196.)

FIG. 196.



A gumma of the liver which has a cheesy centre, a connective-tissue capsule with processes extending into the surrounding tissue, and infiltration of the same with small round cells.

This description outlines the broader features of syphilitic inflammation as a phase or variety of inflammation in general, but we cannot interpret these morbid changes very intelligently until the micro-organism of syphilis is discovered and the nature and action of its toxine is learned.

The chronic production of neuroglia in the central nervous system, due to syphilis, should not be confused with a more specialized form of syphilis of the nervous system which not infrequently occurs in untreated or badly-treated cases. This form of involvement of the nervous system, termed usually, and badly, "syphilis of the nervous system," may occur moderately early in the disease. It has a subacute character, is prone to occur in a disseminated form, especially in the spinal cord, and consists of masses of small round or fusiform cells, which involve either the gray or white matter.

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## CHAPTER LII.

## VEHICLES OF SYPHILITIC INFECTION; NORMAL SECRETIONS NON-INFECTIOUS; AND THE VARIOUS MODES OF SYPHILITIC INFECTION.

**Vehicles of Syphilitic Infection.**

CLINICAL observation and experimental inoculations have proved beyond a doubt that the secretion of the initial lesion contains in a high degree the virus of syphilis. It is from the secretions of the initial lesion that the infection with the disease is derived in the great majority of cases.

Equally as virulent are the secretion and the tissue-detritus of the secondary lesions known as condylomata lata and mucous patches which occur so frequently in and about the mouth and face and on the genital and anal regions. Numerous experimental inoculations have been made with these secretions the results of which prove beyond any doubt their infectious quality.<sup>1</sup> By some observers it is held that these secretions are the most common sources of syphilitic infection. They in all probability rank next in point of frequency of infection to that of the initial lesion, for the reason that they are seated on exposed parts and parts with which others are liable to come in immediate contact.

Experimental inoculations (of course upon human subjects, since animals are immune) have proved beyond all doubt that the secretions from pustules, from syphilitic tubercle, and from ulcers and papules produce typical syphilitic infection in the person operated upon.

Numerous experimental inoculations, already alluded to, with the blood of syphilitics have given rise to well-marked instances of syphilitic infection. Clinical observation has frequently confirmed the results of experimentation as to the infectious quality of the blood of syphilitic subjects.

It seems, however, that it is only in the quite early period of the disease, when the infection is active, that the blood is most poisonous. With the decline of the disease, particularly when it has been profoundly modified by mercurial treatment, the blood becomes more and more feebly infectious, so that in general after one or two years' thorough treatment it is harmless. At best it is the least infectious of all syphilitic-bearing secretions or fluids.

The initial lesion of syphilis, therefore, has its origin—

1. In the secretion of, and organized matter derived from, a previous hard chancre or initial lesion;

2. In the secretions and the organized matter of the secondary lesions of syphilis, whether of the skin or of the mucous membrane: that of mucous patches and condylomata lata has been shown to be especially contagious, and that of papules and tubercles less so;

3. In the secretions of hereditary syphilis in its active state, which arise from buccal mucous patches or erosions, condylomata lata of the mouth or anus, and also from ulcerated tubercular lesions;

4. In the blood of persons in the active state of syphilis: the lymph also may communicate the disease.

<sup>1</sup> Auspitz, *op. cit.*, p. 101 et seq.

Such is the bland, unirritating character of the various infecting secretions of syphilis that it is very probable a door of entry, such as a fissure, an abrasion, or other denuded surface, perhaps so small as not to be visible, is generally necessary for their introduction. It is claimed, however—and no doubt reasonably—that the virus may penetrate the thin, soft, and moist epithelium of mucous membrane. Clinical facts show clearly that it may penetrate into the orifices of the mucous and sebaceous follicles, and in them take root.

Syphilis pursues essentially the same course whether derived from a primary or secondary lesion; in the latter case, as in the former, the initial lesion is a chancre.

It is conceded by most authorities that only the secretions of secondary lesions are infectious, and those of the tertiary period are inert. Unfortunately, we are not in possession of enough knowledge upon this subject to make positive statements. It is very certain that when the disease is active, as shown by the extent and severity of its lesions, the secretions of its bearer are markedly infectious. As time passes the morbid condition tends in most cases to attenuation, and the infectious nature of the secretions grows less. There is a natural tendency in very many cases for the disease to grow less and less active until in the end its virulence may be lost. This gradual extinction of the disease may take place spontaneously without the aid of therapeutics, but this natural involution can never be relied upon. The most potent element in curing the disease and in rendering the subject incapable of infecting others by any means is active and energetic treatment kept up for the first two years or longer. Under proper treatment the infectiousness of the disease more or less rapidly diminishes, and finally becomes extinct. My studies and observations have convinced me that in the majority of cases in which the treatment has been ample and well directed a cure is obtained in two or three years, and then, of course, the subject does not give forth infectious secretions. It is very probable that the secretions and tissue-elements of many of the tertiary lesions, particularly when they are active and numerous and occurring within three, four, or five years, may be endowed with a virulent power, and that as they grow older and less numerous they may lose this virulence. We are sadly in want of exact knowledge on this important subject.

### **The Normal Secretions in Syphilitic Subjects.**

The normal secretions of a syphilitic subject do not of themselves contain any virulent principle. They may be contaminated by admixture of secondary secretions and of the tissue-elements of secondary lesions, and by blood. The saliva is perfectly harmless if the patient's mouth is free from syphilitic lesions and erosions or fissures. This has been clearly proved by the classical experiments of Diday and Profeta, which need not be detailed here. When mucous patches, condylomata lata, and buccal, tonsillar, and pharyngeal hyperplasiæ, excoriations, and fissures exist in the mouth, the saliva is contaminated by their secretions, and is then potently infectious. Since it is so common to see lesions of continuity in the mouth of syphilitics, it is the duty of the surgeon to be always on the watch for them and to warn patients to avoid kissing. Indeed, as a rule,



all subjects of syphilis, even though their mouths seem to be healthy, should avoid the contact of this part with healthy individuals until they are pronounced cured by the surgeon.

The experiments of Vidal have shown that the tears are innocuous. Any secreting syphilitic lesion of the eyes, such as chancre or mucous patch of the conjunctiva and secondary hyperplasia of the caruncle, may of course contaminate this secretion.

The semen of a man, even in the secondary stage of syphilis, is not *per se* an infectious fluid. It may remain on the mucous membrane of the female genitals for a long time without causing any bad result. It does not contain an active virulent principle. This was well shown by a number of well-performed experiments by Mireur, who first produced excoriations upon healthy subjects by instruments and by blistering, and then placed upon them the semen of a man suffering severely from secondary syphilis. In his four experiments absolute failure to inoculate resulted.

When the semen of a man suffering from an active form of syphilis fecundates the female ovum, in the majority of cases he transmits the disease to the infant. In this way alone is the semen of the syphilitic man dangerous.

There are a number of cases reported in literature in which it is claimed that women were directly infected by the semen of syphilitic men, the more notable ones being those of Smith and Jordan. Years ago I submitted all the cases of this so-called method of infection to a rigid and impartial examination and analysis, which need not be detailed here, and the conclusion reached was that the infection was due to blood exuding in the sexual act from the penis upon some abrasion or fissure of the female genitals. Seeing that nearly twenty years have elapsed since a case of this alleged mode of infection has been reported, it may be inferred that there are no longer any believers in it.

The milk of the syphilitic woman does not possess infectious qualities. Padova and Profeta made inoculations and injections upon healthy persons with this secretion derived from an infected woman, and were rewarded with uniformly negative results. In like manner the sweat has been shown to be innocuous upon careful and intelligent experimental inoculation.

It is to be presumed that the urine of syphilitic subjects does not contain the germs of the disease.

### Modes of Infection.

These are, first, direct contact; second, mediate infection; and third, hereditary transmission. We are warranted in assuming that in all instances of syphilitic infection there is a lesion of continuity or gap in the epithelium of the skin or mucosa.

Infection by direct contact is the most common mode of contamination, and the sexual act is the one by which the disease is in most cases given and received.

Direct syphilitic infection frequently occurs in unnatural and beastly methods of indulgence between persons of the same and the opposite sex. In this way are developed chancres of the anus, of the tongue, of the folds between the breast and the sides of the chest, of the axillæ, and of

the tonsils. I have known several instances in which men were infected upon the penis by contact *ab ore* with men or women who had syphilitic lesions in their mouths. Several men have told me that they followed this practice, thinking that by it they would escape syphilitic infection.

Kissing also is a prolific source of infection, and by this act chancres of various parts of the body are produced.

Not infrequently hereditarily syphilitic children infect their nurses upon the nipple from mucous patches in the mouth. Then, again, children have been infected from chancres or condylomata lata on the nipples of their nurses.

I have a number of times seen chancres of the nipple in women produced by suction of a man having mucous patches in his mouth. Then, again, I have seen two instances of chancre of the nipple in men contracted from the mouths of syphilitic women in the act of suction.

There are in literature many cases reported in which syphilitic midwives, usually of the lower classes, have infected nursing women with syphilis upon the nipple in the act of suction or drawing the breast, which they sometimes perform.

In some European countries, particularly Roumania, a singular mode of transmission is said to occur. It is the custom there to attribute all affections of the eyes to foreign bodies, for the relief of which there is a class of women, called "leeching oculists," who suck or cleanse the eyelids with their tongues. One of these women, having mucous patches in her mouth, conveyed the disease to many persons.

Syphilitic infection is sometimes produced during brawls and fights in which an infected person bites his or her antagonist. In this way, also in exuberant embraces between the sexes, one or the other sometimes becomes syphilitic. I vividly recall the case of a lady who had a hard chancre under her chin who was playfully bitten by a syphilitic lover, and that of a gentleman having a chancre of the neck who was bitten in an amorous encounter with a *puella publica*.

Surgeons very frequently contract syphilis on cuts and abrasions about the fingers and hands when operating upon syphilitic subjects. Physicians, accoucheurs, and midwives also frequently contract syphilis in vaginal examinations of infected women. They, in turn, have been known to spread infection far and wide in an epidemic form by infecting women during examinations about the genitals by means of their finger-chancres. From the infected wives the husbands, children, and friends have become contaminated.

There are many cases in literature in which syphilis has been communicated in the operation of tattooing, the operator using his own saliva, which was contaminated by the secretion of mucous patches.<sup>1</sup>

In the operation of skin-grafting the disease has been given to the person operated upon by the graft, which was derived from a syphilitic subject.

Dentists sometimes contract syphilis from the mouths of infected clients, and it is very probable that the latter are sometimes infected by means of instruments smeared with active syphilitic secretions. It is a good rule to avoid the services of a careless or uncleanly dentist.

<sup>1</sup> The details of these interesting cases would require too much space. The reader will find them in Dr. Buckley's work, *Syphilis of the Innocent*, which gives a comprehensive, up-to-date bibliography of published cases of extragenital chancres.

In ritual circumcision, when the flow of blood is stanchd by immersion of the infant's penis in the mouth of the operator, there is danger of syphilitic infection.

In these days, when pure bovine virus is used in vaccination, there is no possibility of the transmission of syphilis by that secretion.<sup>1</sup> The danger arises in carelessness on the part of the operator in using a soiled scarificator. In the hurry incident to the vaccination of many persons the surgeon is liable to become careless and to fail to cleanse his instrument after each operation. In this way it may happen that a syphilitic patient may be vaccinated and the instrument used may become smeared with blood and tissue-débris. Then, if this instrument is used to scarify the next subject without having been cleansed or subjected to a flame, this blood and these tissue-elements are firmly implanted upon and into his or her excoriated surface, and it is pretty certain that syphilitic infection will be produced. I saw a striking instance of this form of transmission of syphilis many years ago when most of the inmates of the Blackwell's Island penitentiary were vaccinated. The victim was a baby, the offspring of a convict mother, and the source of the infection was a female prostitute suffering from active secondary syphilis who was vaccinated immediately before the infant. The golden rule of action under these circumstances is to have an alcohol flame at hand, and to submit the scarificator to it after each operation. A longer time will of course be required, but there would be no fear of syphilitic infection.

*Mediate Infection.*—In this form of infection the disease is communicated by means of articles, implements or instruments which have become smeared or impregnated with the syphilitic virus. In the cases of this form of infection the contaminated parts are most commonly the lips, the gums, the mouth, and the eyelids. Any part of the integument and of the genitals may also be the seats of infection. The following list includes most of the articles and instruments which have been found to be the agents of mediate syphilitic infection: cigars, cigar- and cigarette-holders, pipes, tooth-brushes, tooth-powders, drinking utensils, knives, forks, spoons, razors, towels, sponges, pillows, masks, gloves, wash-rags, linen thread, silk thread, pins, needles, children's toys, nursing-bottles, rubber tubes, babies' rubber rings, trousers, women's drawers, bandages, surgical and cupping instruments, manicure instruments, syringes, scarifiers, dental implements and appliances, caustic-holders, blowpipes, paper-cutters, lead-pencils, speaking-trumpets, musical instruments, fish-horns, whistles, the mouth-piece of the telephone, chewing-gum, and even pastilles and candy.

There is a mode of syphilitic infection which has not yet been described—it is really auto-infection. It generally occurs in this way: A man, fearing to contract venereal diseases or for other reasons, contents himself with a digital exploration or fondling of the female genitals. Upon the latter condylomata lata or syphilitic excoriations being present, the fingers of the man become soiled with their secretion. Then by accident the virus is transferred by the finger or fingers of the man to some other part of his own body, generally by scratching or picking. In this mode the finger becomes a medium of infection, and the infected parts are

<sup>1</sup> The reader is referred to an exhaustive discussion of this subject by Fournier, entitled *Leçons sur la Syphilis vaccinale*, Paris, 1889.



usually the alæ nasi, the tip of the nose, the chin, the cheek, the neck, the arm, and the back of the hand.

It is rather revolting to one's feeling to put the matter on paper, but the interests of medical science certainly warrant the recital. I have seen two cases in educated and religious people in which the weight of evidence strongly pointed to the origin of their labial chancres in the communion cup. Knowing as we do so well that many innocent persons, particularly women, become unconscious victims of syphilitic infection and still follow the observances of a religious life, it is not far-fetched to assume that their diseased mouths may contaminate the sacred chalice.

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## CHAPTER LIII.

### THE CHANCRE, OR THE INITIAL LESION.

AT the end of the *first period of incubation* the first evidence of syphilitic infection shows itself in the form of a small and usually innocent-looking lesion, which, as we have seen, is called the initial lesion, the Hunterian chancre, and by other terms. In the great majority of cases the initial lesion is seated on the sexual organs, and it is then termed genital chancre, while that found elsewhere on the body is called extra-genital chancre.

This first period of incubation, as we have seen, varies in length between twelve and thirty, and most exceptionally forty, fifty, sixty, and seventy, days. It follows, therefore, that if a man seeks information as to his chances and condition after a suspected or suspicious coitus, he must be told that at any time between the fifteenth and sixtieth or seventieth days the chancre may appear, and that he must be constantly on the watch for it, for his own benefit in promptly seeking treatment and for the protection of women with whom he may have intercourse. In the vast majority of cases it is not necessary to prolong a man's anxiety and even agony beyond thirty days.

It is very important that clear ideas should be held as to the induration of chancres. The terms hard and indurated chancres act as stumbling-blocks to very many physicians in their estimate of the nature of genital ulcers and lesions. The tendency, I observe, has been not so much to form an opinion by a consideration of the physical appearance of a given lesion as by its relative hardness and softness of structure. When a genital lesion is brought to the attention of the surgeon, he instinctively feels of it, and in general, if he can find no resistance or induration, he at once pronounces it to be a soft sore, or chancreoid. In this way mistakes in diagnosis are made every day. Now, in the outset it is important to know that induration is not present in primary syphilitic lesions in their early days. The cell-proliferation which gives rise to the symptom of induration goes on, as a general rule, slowly, and it is seldom

clearly and sharply appreciable before the tenth day; and in broad, general terms it may be stated that, as a rule, fourteen days elapse before sharply-marked, circumscribed, easily appreciable induration is present in a primary syphilitic sore.

In a large majority of cases there is but one chancre or initial lesion, but it is not at all uncommon to see two or three, and exceptionally four, six, seven, and even more, initial lesions. There is a deep-rooted and widely prevalent view in the minds of many medical men that the initial lesion is invariably solitary, and that when several genital ulcers and even excoriations are seen they must be chancroids. As a result of this an incalculable number of mistakes in diagnosis are constantly made, which result in disappointment and often disgust to the patient, and in deep chagrin to the surgeon. This opinion is a relic of the old-time over-elaborated differential diagnosis between the chancre and the chancroid. Dualists harped upon the solitary chancre and the multiple chancroid. It must be remembered that a multiplicity of lesions is only measurably presumptive of their being chancroids, and that there is a large chance that they may be hard chancres; consequently, their examination should always be very carefully and thoroughly made. The penis, the female genitals, the female breasts, and the cephalic regions are the parts upon which multiple lesions are most commonly found.

In the male chancres are found on the glans, on the prepuce, on the skin of the penis, on various parts of the penis, involving the meatus, within the urethra (not visible on forced separation of the lips of the meatus, but recognized by palpation, inflammation of the lymphatics, etc.), on the scrotum and peno-scrotal angle, the anus, the lips, the tongue, the gums and hard palate, the pharynx, including the tonsils, the nose, the pituitary membrane, the eyelids, the fingers, and on the legs.

In women chancres are found on the labia majora, at the entrance of the vagina, the meatus, the nymphæ, the fourchette, the sheath of the clitoris, the anus, the buttocks, the thighs, the lips, the labial commissures, the nostrils, and the breasts, one or both.

As we have seen in the previous chapter, the initial lesion consists of a localized mass or tumor of granulation-tissue. In its very earliest stages it consists of small round-cells which are seated in coat-sleeve-like arrangement around the vessels. In this condition the symptom of induration cannot be clearly defined. As the lesion grows older these cells, which some think are emigrated white blood-corpuscles, become more numerous and closely packed, and they develop into elongated connective-tissue cells. When this occurs induration is perceptible to the touch. Besides these component parts—namely, infiltrated blood-vessels, small round cells, and spindle-shaped cells—there are intermixed among them cells resulting from hyperplasia of the fixed connective tissue. These elements, therefore, constitute what we call the hard or indurated chancre.

### **Appearance of the Initial Lesion or Chancre.**

It is very necessary that the diagnosis of the chancre should be made early, since a prompt recognition of its highly infectious nature may save other persons from contamination. In its early stages the chancre is such a seemingly trifling and innocent lesion that its virulence is very apt to be overlooked.

There are six conditions under which chancres appear at their very beginning: these are—First, the chancreous erosion; second, the silvery spot; third, the dry papule or patch; fourth, the umbilicated papule or nodule or follicular chancre; fifth, the purple necrotic nodule; and, sixth, the ecchymatous chancre.

Besides the six type forms, there are the following varieties which are due to certain changes to which the primary sore is liable: the ulcer elevatum, multiple herpetiform chancre, the parchment chancre, the annular chancre, the indurated nodule or mass, the chancre with cream-green membrane, and infecting balano-posthitis.

*The Chancreous Erosion.*—The chancreous erosion, by far the most common form, is really the primordial lesion from which all chancres develop. It begins as a minute, sharply-rounded excoriated spot, the surface of which is on a level with the surrounding parts. It looks exactly like an erosion or shedding of the uppermost epithelial layer. (See Plate III., Fig. 1.) The color is a dull red, which later on may assume a coppery hue.

This form of chancre is most marked on the internal surface of the prepuce, by which it is protected from the air, irritation, and friction; and it is in this situation that it is most frequently met with. It has generally a circular or ovoid, but sometimes irregular, outline. Its floor is but slightly, if at all, excavated, and occasionally is even elevated above the surrounding integument. It has a smooth, polished surface, usually destitute of granulations, but sometimes slightly granular and velvety, from which considerable serous fluid oozes, particularly on manipulation. Its surface is destitute of the consistent and adherent exudation of the chancroid. At times it is dark or even black, owing to molecular gangrene. This lesion sometimes becomes decidedly saucer-shaped.

Usually there is but one such lesion, but there may be three, four, or five, and very exceptionally more than a dozen. When a number of these chancreous erosions are grouped together in the corymbus-like form peculiar to herpetic vesicles, for which they are very liable to be mistaken, they are called *multiple herpetiform chancres*, a variety first described by Dubuc. These chancres have a diameter of a line or less; they look like small round excoriations, of a deep-red, sometimes coppery hue, which bleed readily and have a very slight induration of their bases. The induration often increases at a later period. From five to fourteen chancres may be observed upon the prepuce or glans. In their first stage the diagnosis is difficult, but the absence of itching and burning, their dark color, and their chronicity are points which aid in distinguishing them from herpes. Another important feature is that their surface is very smooth and shining. Moreover, induration of the inguinal ganglia is soon developed. The duration of these herpetic chancres is, according to Dubuc, a month or six weeks. In exceptional cases, in which the chancres are not close together, they remain separate during their whole course. In the majority of cases they are closely grouped, and, after remaining for several weeks in the herpetic form they unite and form a single chancre.

The chancreous erosion is constantly mistaken for herpes progenitalis, and is in many instances pronounced by the surgeon to be a simple chafe or excoriation. Consequently, it is always well to be cautious and slow in expressing opinions concerning small and seemingly insignificant lesions of the genitals. The smooth, shining sur-



# PLATE III.



Hard Chancres.



face of the syphilitic lesion is in many cases clearly diagnostic, but it may, owing to extraneous influences, become rather granular and perhaps ulcerated. Leloir claims that herpetic vesicles give issue, particularly if pressed between the finger and thumb, to a copious serous secretion, and that this does not occur in cases of the chancrous erosion; therefore, that this is a diagnostic sign between herpes and the syphilitic lesion. The truth is (see Chapter XXXVI., p. 429) that the chancrous erosion gives issue to far more serum than does the herpetic lesion.

As the chancrous erosion grows older it becomes rather more salient, and sometimes its surface is a third or more of a line above the normal plane. It may also become complicated by induration in the connective tissue beneath it. When it simply remains a superficial, compact lesion, the induration is spread out into a disk-like mass, and the lesion is then called the *parchment-like chancre*. On the other hand, when the syphilitic process dips down into the subcutaneous connective tissue, and is complicated with indurating œdema, the chancrous erosion becomes the *indurated nodule*. Parchment-chancres are mostly found on the integument of the penis and sometimes in the vulva. Indurated chancres are mostly found in the sulcus coronarius, particularly near the frænum. (See Plate III. Fig. 9.) As the chancrous erosion grows old it may show a tendency to become more or less papillated or even the seat of well-marked granulations.

In many cases the sharply-limited area beneath the chancrous erosion becomes the seat of new cell-growth, and a much deeper lesion then results. As a rule, coincidently with the development of the underlying tissue the chancrous erosion becomes more salient above the normal plane, even to the extent of two or several lines. The lesion is then known by the old-time name *ulcus elevatum*, which is partly incorrect, since there is in uncomplicated cases no ulcerative process present. In like manner, according to the old nomenclature, a salient chancroid was called *ulcus elevatum*. They are both the result of sharply circumscribed cell-growth, in one case (chancre) specific, in the second (chancroid) simply inflammatory.

In many cases these flat or elevated chancres become covered with a false membrane, very incorrectly called "diphtheritic," which is peculiar in having a color which is a mixture of a cream with a light-green tint. This membrane may exist for longer or shorter periods. As it grows old, if not shed it sometimes becomes in whole or in part of a brown or brownish-black color. It, as a rule, does not cover the whole of the chancrous surface, but rather its central portions, leaving the margins free. This film-like or more dense membrane is very distinctive, even diagnostic of chancres. It is well shown, as to extent and color, in Fig. 3, Plate III., seated on a well-marked indurated nodule. (In Figs. 2, 4, and 8 also it is well portrayed from my own cases.) This membrane often becomes discolored by the admixture of dirt and also as a result of minute hemorrhages. Thus in Fig. 5 the membrane is darker than it is in the previous figures, while in Fig. 7 it reaches its acme. This membrane may remain on the sore for a short or a long time. If antiseptic lotions or iodoform is used, it melts away and an erosive chancrous surface is left. This lesion may very properly be called the *chancre with the cream and green-colored membrane*.



In some rare cases these chancres become necrotic, an accident which is well shown in Fig. 6, Plate III.

*The Silvery Spot.*—This lesion, first described by me, is very rare and presents well-marked features. It generally occurs on the glans and on the lips of the meatus, and at first it looks as if a pinhead-sized spot of mucous membrane had been touched with carbolic acid or nitrate of silver. Examined with a magnifying glass, there is no other change evident than the peculiar staining of the superficial epithelial cells. The silvery lesion increases slowly but visibly day by day, and preserves its integrity of surface until it reaches an area of about a line, when, coincidentally with the subjacent induration, which has been simultaneously developing, and which has slowly raised it up into salience, it disappears, and is replaced by a smooth, shiny surface like that of the chancreous erosion or that of some indurated nodules.

*The Dry Papule—Papule Sèche of Lancereaux.*—This chancre is usually found upon the glans or prepuce when not in a state of coaptation, and consequently is always developed in a very dry condition. As a rule, it is solitary, and is not uncommonly seen on persons who have been circumcised or who have short prepuces. It is found upon the integument of the penis, about the pubes, on the thighs, and elsewhere upon the body. This form of the initial lesion begins as a dull-red spot, which increases in area as it grows to a height of from a half to one line, and even half an inch. Its evolution is slow and aphlegmasic, and when fully developed it often resembles somewhat a not very scaly papule or patch of psoriasis, but is of denser consistence. Its surface is flat or slightly convex, its color a brownish-red, and it may or may not have a faint inflammatory areola. It may thus run its course and subside gradually into a deeply pigmented macule, or it may become exulcerous on its surface. From this exulcerous condition it not infrequently becomes encrusted, in which case there may be the creamy-green membrane or a thin brown or brownish-black crust over its surface.

A modification of this form of the initial lesion has been described as "diphtheroid of the glans," a very incorrect term, since neither in appearance nor course does the lesion at all resemble diphtheritic membrane, which is always seated on an excoriated surface. It consists of patches of a glistening grayish-white color, presenting either a greasy sensation to the fingers or something like that of wet chamois-skin. The lesion is slightly salient, not at all indurated, involves the superficial tissues, the mucous membrane of the glans, and sometimes of the prepuce, and has sharply defined borders and gives rise to no secretion from its surface. It may involve more or less of the glans, and is sometimes continuous with an indurated nodule of the prepuce. In this lesion the syphilitic cells are developed in the superficial tissues of the glans, which are thereby thickened and assume a leathery appearance. The whitish color is probably due to the close packing of the cells.

*The Umbilicated Papule or Follicular Chancre* is a rare form of the initial lesion, of which I have seen six cases. It begins as a small pinkish elevation of the size of a milium, with a minute depression in the centre, which grows slowly and assumes in form the appearance of a tumor of molluscum sebaceum. Further increase takes place until a pea-sized tumor is formed. As the lesion grows the central depression

becomes broader and deeper, until in its full development the chancre is cup-shaped and as if set in the mucous membrane, with its borders markedly elevated. It is firmly indurated, sharply circumscribed, and the deeply concave surface is smooth, glossy, of a deep-red color, and exulcerated. In two cases the veins and lymphatics, enlarged to the calibre of a goosequill, extended along the penis, and the shape of the lesion could be compared to a miniature flute. In this form of chancre the syphilitic virus probably enters the duct of a Tyson's gland or one of the minute crypts or invaginations of the mucous membrane, and there produces a subcutaneous nodule which develops in the manner just described.

*The Necrotic Nodule.*—The purple necrotic nodule is also a rare form of the initial lesion. It is always, according to my experience, found upon the glans penis and in the coronary sulcus. It begins as a small dark-red spot which soon becomes elevated; as it grows its color deepens; it becomes salient and roundedly convex on its surface. Palpation shows that it is of firm texture and perhaps of much density. In its period of full development it is a purplish papule with shining surface, about as large as a split pea, sometimes larger. It may happen that no visible degenerative changes may take place in this lesion, in which event it slowly subsides, loses its color, and on its site a depressed pigmented cicatrix is left. Then, again, necrosis occurs in its whole extent. It slowly or promptly exulcerates and melts away, and when healing has taken place there is a distinct loss of tissue, as if the part had been taken out with a punch.

In these cases the necrosis probably results from the interference with the circulation exerted by the dense cell-infiltration. This underlying cause may be rendered more active by such external influences as irritation and dirt. A depraved condition of the system of the patient may also have its influence in the matter. When we consider the density of many chancres, it seems remarkable that we do not encounter extensive necrosis in them more frequently than we do.

#### THE ECTHYMATOUS CHANCRE.

The ecthymatous chancre is simply a chancre which becomes covered with a pus-crust. It is developed from the dry papule or the chancrous erosion or the *ulcus elevatum*. The surface of the lesion becomes mildly exulcerated, and slowly a flat crust forms which is of a brownish-black or greenish-brown color. (See Fig. 10, Plate III.) The crust is formed of pus-cells, tissue-detritus, and numerous microbes. The term "ecthymatous" might carry with it the impression that the lesion begins as a pustule; this it never does. It is simply a hard chancre which is mildly irritated on its surface, and as a result slowly becomes covered with a crust. In this particular only does this lesion resemble ecthyma. This form of chancre is found upon cutaneous surfaces, particularly of the penis and the juxtagenital parts. It may be found elsewhere on the integument. The lesion may be single and sometimes multiple.

#### THE PARCHMENT CHANCRE.

The so-called parchment-like chancre is, as we have seen, simply a chancrous erosion in which the cell-proliferation is superficially distrib-

uted in a flat disk-like form. It is usually found on the integument of the penis, the lesion varying in size from one-third of an inch to one inch in diameter.

### THE ANNULAR CHANCER.

The term "annular chancre" is applied to primary lesions in which the great part of the new growth is developed in a ring-like form, the centre of the lesion being less thickened and infiltrated. Sometimes this ringed development is strikingly apparent, in others it is less so. This form of chancre is found on the internal surface of the prepuce, sometimes on the glans, and again on cutaneous surfaces, particularly of the penis. This annular development of the chancre is well shown in Fig. 4, Plate III., in the large lesion. It must be remembered that the tissue within the ring is hyperplastic, but much less so than its margin.

*The indurated nodule* is a localized mass of syphilitic cells which have developed by age and the activity of proliferation from any of the above-described forms of initial lesion. Whereas in some cases the infecting process is limited in its whole course to the upper part of the derma or mucosa, in many cases the infiltration invades the underlying connective tissue. Then we have small circumscribed masses or small or large nodules. In the male these nodular lesions are most commonly found near the frænum and in the mucous layer of the prepuce near the coronal sulcus, also upon the meatus, sometimes the glans, and on the skin. (See Figs. 3, 8, and 9, Plate III.) These nodules may be very small—for example, of the size of large bird-shot—even near the frænum, in which case their nature is apt to be overlooked. Then, again, they occur in goodly sizes, as large as a split pea and larger, and as diffuse masses of an inch or more in thickness and of corresponding breadth. In some cases the indurated nodule rapidly becomes covered with epithelium, and then exists as a well-defined, sharply-limited lump in and under the skin. It, however, may have the appearance of the chancrous erosion, or it may become encrusted by the cream-gray false membrane, which from many causes, as we have seen, sometimes becomes brown or greenish-black. These indurated nodules in untreated cases remain for long periods, weeks and months, in an indolent condition, and then their size may be increased by a circumambient hard œdema. The result is that a very large lesion is produced. (See Figs. 7 and 9, Plate III.) In this state of apathetic chronicity the surface of the lesion may become markedly papillated or warty, and it may then be mistaken for cancer of the penis. I have known a number of such errors when amputation of the penis had been decided upon.

These indurated nodules very often are extremely slow in disappearing, even under active local and constitutional treatment.

### INFECTING BALANO-POSTHITIS.

Under the term "infecting balano-posthitis," first described by Mauriac, is understood a development of the initial lesion, in a diffuse plate-like form, in the mucous layer of the prepuce, and sometimes also



in the superficies of the glans. This lesion usually begins as a goodly-sized chancrous erosion, which spreads peripherally until more or less or perhaps the whole prepuce is involved in the hyperplastic process. The appearance of the parts is then striking. The prepuce is thickened, usually of a dull, deep red, and has a velvety excoriated appearance. Retraction of the prepuce becomes difficult and perhaps impossible. Not infrequently this condition of the prepuce coexists and merges with a circumscribed indurated nodule or nodules at the coronal sulcus or frænum.

This infecting balano-posthitis is sometimes seen in a condition which has not been hitherto described. The infecting process then begins with little or no excoriation, and the parts are normal in color. The prepuce gradually becomes thickened until more or less of its extent is involved in patches or disks. The color of the parts being normal, the surgeon is liable to overlook the nature of the process. I have seen several cases in which the only visible evidence of disease was that the inner layer of the prepuce was thrown into little transverse folds. On palpation a mild, diffuse, not well-circumscribed, thickening is felt. The course of the lesion is chronic, but it yields readily to internal and external treatment. The lesion consists of an infiltration of the submucous tissue with hyperæmia; in other words, it is a combination of cell-infiltration and hard œdema.

### Induration.

By the term "induration" we include not only the sclerotic process which forms the chancre, but also the complicating hard, indurating, and sclerotic œdema which develops around the chancre, and also some early secondary lesions, such as mucous patches and papules. The pathology of this indurating process is given in Chapter LI.; its clinical history comes under the general term "induration."

Induration as a symptom depends entirely on the growth of the initial lesion. At first there is only a mild hyperplasia, but as the cell-increase goes on the hardening of the tissues occurs. In most cases fully ten days, even fourteen days and longer, elapse before we have that hard, indolent, circumscribed lesion which presents such a marked contrast to the features of diffuse, doughy, inflammatory hyperplasia.

The induration of chancre is, as we have seen, a peculiar hardness of the tissues around and beneath the sore. Simple inflammation may occasion an effusion of plastic material and consequent engorgement about any sore; but specific induration is of an entirely distinct character. The latter is formed, as the French say, "*à froid*"—that is, without inflammatory action; the deposit takes place in the absence of all symptoms of inflammation, pain, heat, redness, and swelling, and so silently, so insidiously, that the patient is often ignorant of its presence or discovers it only by accident. No event is more common than for a surgeon to be consulted by a man who states that he had a sore some weeks ago, which gave him no concern, and healed up, but he has recently found that it left a lump behind it. This lump is the specific induration.

Again, specific induration and inflammatory engorgement differ in their objective symptoms. The boundaries of the former are clearly

defined, while the extent of the latter cannot be limited with nicety; the one terminates abruptly, the other shades gradually into the normal suppleness of the part; the first is freely movable upon, the second adherent to, the tissues beneath. The difference in the sensations they impart to the fingers is still greater: specific induration is so firm, hard, and resistant that it is often compared to a "split pea" or mass of cartilage; the softer and doughy feel of common inflammatory engorgement requires no description. It is hardly necessary to say that there is no incompatibility between these two pathological conditions which can prevent their coexistence, and hence arises, in some few cases, a difficulty of diagnosis. The effect of simple inflammation, however, subsides in a few days or in a week or two at farthest, and lays bare the specific induration, which may, for a time, have been buried beneath it; and under all circumstances reference may be made to the neighboring ganglia, the induration of which is equally constant and significative with that of the chancre.

In the masses of induration of considerable size to which the above description chiefly refers the adventitious deposit occupies the skin or mucous membrane bordering upon the edges of a sore, and also the cellular tissue beneath it. In the parchment chancre, as we have seen, the induration process is limited to the thickness of the mucous membrane.

In general it may be said that induration is extensive in proportion as the connective tissue is abundant. Thus at the frænum and in the balano-preputial furrow it is generally exuberant, while on the glans penis it is, as a rule, limited in area and thickness, owing to the small quantity of submucous connective tissue.

Specific induration usually remains for a long time after the cicatrization of the chancre, and, unless dissipated by treatment, may in most cases be felt for at least two or three months, and often longer. Thus near the frænum and behind the sulcus coronarius it may in neglected cases remain nearly a year. It is also persistent when it attacks the glans penis. In women induration of the labia majora, and also of the labia minora, may last for long periods.

Induration is sometimes much shorter lived; the parchment form especially, and exceptionally the small nodules, may entirely disappear in a remarkably rapid manner before the chancre heals, and the cicatrix present as soft a base as the chancreoid.

As the process of absorption goes on the indurated mass becomes less firm and resistant, and gradually softens until it can finally no longer be detected. In other instances, after partial absorption has taken place, the induration suddenly resumes its earlier dimensions; and this is most likely to occur upon the first appearance of secondary symptoms or at a subsequent relapse of the same.

Under the name of "*indurations de voisinage*" Fournier describes masses of induration contemporaneous with the chancre, and occurring secondarily at a short distance from it. Although the surface of such indurations usually remains intact, it may take on ulceration in the manner hereafter described.

*Relapsing Indurations (also called Pseudo-chancre induré, Chancre redux).*—The genital organs may at any time in the course of syphilis.

be the seat of indurated nodules, which are liable to be mistaken for primary lesions.

They are of two kinds, the superficial and deep. The superficial induration is in every respect like a true chancre, consisting of a localized infiltration, somewhat elevated, having a smooth, exulcerated surface which secretes a scanty mucous fluid. It generally appears upon the mucous layer of the prepuce or upon the glans in the form of a small papule. It runs an indolent course, but may reach quite a large size. It may be accompanied by enlargement of the inguinal ganglia if it appear within the first and second years. It sometimes appears exactly on the former seat of a primary lesion, and is generally solitary. It may also develop upon an herpetic lesion, on an erosion or a fissure. It is not uncommonly seen as a localized thickening of the mucous membrane, the surface of which is intact. These superficial relapsing lesions are sometimes very rebellious to treatment, both external and internal—a feature in marked contrast with what occurs in the initial lesion.

These superficial relapsing indurations in some rare cases recur from time to time at intervals of months and of a year or two. I saw one case in which a man was attacked six times by these lesions.

The deep relapsing induration occurs in the submucous connective tissue of the prepuce and of the labia majora. It consists of a sharply-defined nodule of cartilaginous hardness, freely movable and generally not adherent to the mucous membrane. Its growth is rapid, and it sometimes reaches the size of a nutmeg. There may be several of these tumors, and I have seen five in one case. The lesion may remain inactive for a long time, causing no pain, but giving some inconvenience in coitus. In some cases it contracts adhesions with the surrounding soft parts; exceptionally, it undergoes necrosis and forms a deep ulcer which is difficult to cure. In women the infiltration is often very large, involving perhaps the whole labium. The induration is very marked and often persists for years. In rare cases the lips and the labia minora are involved. There is usually no enlargement of the inguinal ganglia with the deep induration, either in men or in women.

These indurations may occur as early as the first and as late as the tenth year of syphilis. They are amenable to early treatment, but are more obstinate with age. They have been known to undergo spontaneous involution and to relapse after complete cure. It is important to distinguish them from primary lesions of syphilis. Many of the reported cases of reinfection have no doubt been in reality examples of relapsing induration.

The secretion of the syphilitic chancre is serous in character, and its sero-purulence or purulence is due to adventitious causes, such as irritants of various kinds. There is every reason to believe that much of the destructive metamorphosis of chancres is engrafted upon them by pyogenic microbes. Indeed, in many instances we see not only syphilitic infection from a chancre, but also pyogenic infection. The immaturity of the newly-organized cells renders their existence precarious, and in consequence we frequently see on the surface of chancres molecular decay or gangrene. This form of decay also has its origin in the strangulation of the capillaries by the closely-packed new cells, the result of which is



necrosis limited to the parts supplied. This strangulation of the vessels is an important factor in the phagedena which sometimes attacks hard chancres.

After healing and absorption the chancre usually leaves its indelible trace, as some French authors call it, in the shape of a more or less well-developed scar, which is generally depressed, and sometimes it is nodular.

The **duration** of the initial lesion of syphilis is very variable, and depends largely upon the extent and density of the new growth. In some cases it is so slight and insignificant that it comes and goes without its presence having been known or without leaving a trace. This anomaly is sometimes seen in women, less commonly in men. The tissue forming the primary nodule, being of unstable nature, is peculiarly susceptible to the action of mercury, under which it can often be seen, as it were, to melt away. So that if the chancre, as it often does, lasts until the evolution of secondary lesions, it usually disappears quite rapidly under the influence of systematic treatment. But in some cases it is very voluminous and persistent, and may exist for months. Those old-time and oft-quoted cases in which it is said to have lasted years were in all probability instances of fibroid cicatrices resulting from chancres. I have seen many of these which had been regarded as persistent and permanent indurations, whereas the syphilitic neoplasm had vanished years before and was replaced by firm fibrous tissues.

Ricord first called attention to the fact, which has since been verified by many observers, that a chancre during the reparative period may be transformed into a mucous patch, and thus a primary be changed into a secondary lesion. This transformation may take place upon any part of the body, whether of skin or mucous membrane, but more frequently upon the latter, especially when habitually in contact with an opposed surface, whereby heat and moisture are maintained; as, for instance, upon the internal surface of the prepuce and the labia majora and upon the lips and tongue. Davassee and Deville have carefully studied the progressive changes by which this process is accomplished.<sup>1</sup> The surface of the chancre loses its grayish aspect and fills up with florid granulations, commencing at the circumference, as in the ordinary period of repair; but just as these changes are reaching the centre of the sore a narrow white border of plastic material appears around its margin, and, extending toward the centre, finally covers it with the membranous pellicle which is characteristic of a mucous patch. If the patient does not come under observation until these changes have been effected, the initial lesion of his disease may be supposed to be a mucous patch instead of a chancre.

Phagedena is to-day a rather rare complication of hard chancre, and when present may be mild or severe. In some cases only the parts in the vicinity of the chancre are attacked, and the process is of not long duration. In very severe cases the glans or the penis itself may be more or less destroyed. Bad instances of phagedena are usually observed in careless, unhealthy, and intemperate patients, particularly in those who are uncleanly and apply too strong caustic applications to their chancres.

<sup>1</sup> "Études cliniques des Maladies vénériennes; des Plaques muqueuses," *Arch. gén. de Méd.*, 4e Série, vol. ix. p. 182.

### Chancres of the Urethra.

Chancres may be seated on one or on both lips of the meatus, but they most commonly involve the circumference of the urethra. In some cases there is no ulceration of any degree, the lip or lips of the meatus being scarcely, if any, redder than normal, and the only appreciable morbid process being the condensation and induration of the parts. Induration here is usually very well marked. Sometimes one lip of the meatus and the wall of the urethra feel as if formed of a thin plate of ivory. This same condition is often found in both lips. Then, again, a distinct, hard nodule may be felt at the distal end of the urethra. Chancres at the meatus may be of the form of chancrous erosions or they may present the typical cream-green tint, which may become of a deep, dull green or even of a greenish-black color. A diagnostic mark of much importance in this form of chancre is the purplish-blue color of the glans in a halo-like form. This is well shown in Fig. 8, Plate III.

Chancres, usually of the erosive form, are found down the urethra, even as deep as three or four inches.

All chancres of the meatus and urethra cause more or less impediment to urination. This is observed to be particularly severe in cases in which a pinhead-sized stenosis of the canal has been produced by the infecting hyperplasia, when pain and difficulty in micturition are excessive.

These chancres give issue to a scanty or moderately profuse sero-purulent fluid, which may mislead the surgeon into the belief that the case is one of anomalous gonorrhœa. In all cases which give a history of a painless affection with non-inflammatory and scant muco-purulent secretion the condition of the urethral walls must be examined with a view of determining whether a chancre is present. In some cases there is a profuse purulent discharge, and exceptionally acute symptoms are present.

*Chancres of the fossa navicularis* and of the deeper parts begin painlessly, with mere gluing of the lips of the meatus as their first symptom. Soon there is slight pain as the urine first passes, and the patient discovers a thickening of the tissues at the site of the chancre. The discharge is sometimes muco-purulent, but again may be decidedly purulent, and as considerable in quantity as in ordinary gonorrhœa. This is due to the fact that the lesion sets up a urethritis of the contiguous membrane. Externally is found in the corpus spongiosum a hard, tender, circumscribed nodule, which gives pain on urination and on erection of the penis. With the endoscope we observe rigidity and erosion of the urethral walls, which have a grayish-red color.

### Chancres of the Scrotum.

In somewhat rare cases chancres appear on the scrotum, usually on its anterior or lateral portion, rarely on the back part.

The initial lesion in this locality is, as a rule, of goodly size, varying between that of a three-cent silver piece and that of a quarter-dollar, sometimes even larger. Two varieties of lesion are commonly met with—the chancrous erosion and the encrusted chancre. The lesion is round or oval, somewhat elevated, having a smooth, flat, velvety surface when of the erosive type, and being somewhat concave or saucer-shaped when of the encrusted type. The false membrane which covers scrotal chan-

eres (see Fig. 5, Plate IV.) is of the grayish-green color already described, but it may become yellowish and brown, and even black. These lesions are sharply margined and have a narrow red areola. There is usually not much induration connected with them, and it is in general of the parchment variety. There may be one or two chancres, rarely more than three. I once saw an inflamed and exulcerated wen on the anterior wall of the scrotum which had been mistaken for an exuberant hard chancre.

### Chancres of the Anus.

Chancres are found beyond the anal ring at its margin, and within the ring as far up as an inch and perhaps farther. These lesions in this location do not usually present clearly-cut features. Outside the anal ring they may be oval or round or of irregular outline. They are of a pale rose, sometimes red, color, covered with a slimy secretion, and perhaps creased or fissured. Within the anal ring they are usually found in the shape of sluggish, hardened fissures. These are much less painless than simple fissures—a diagnostic point of much importance. A further point is that with this form of chancre there is marked enlargement of the inguinal glands.

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## CHAPTER LIV.

### EXTRAGENITAL CHANCRES.

#### Chancres of the General Integument.

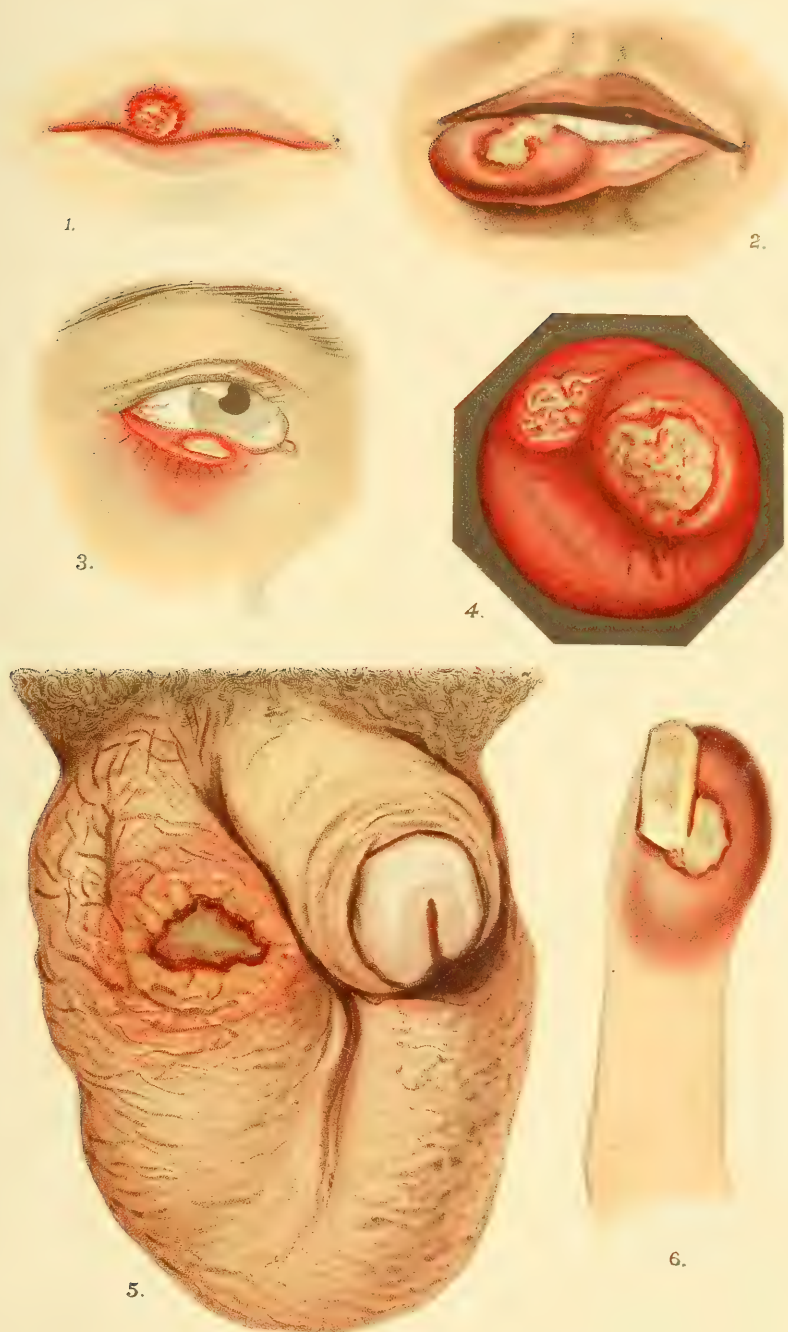
CHANCRES appearing on parts other than the genital organs are called extragenital chancres. They are mostly found on the face, the neck, the arms, the fingers, the hypogastrium; in fact, they may be found on any part of the body. Chancres begin as a small, dull-red papule with more or less scaliness, which, if situated on parts in coaptation with another surface of integument, becomes a chancrous erosion, and in that form runs its course. Usually these chancres become encrusted. The crust at first is of the cream-green color, but this feature may soon be lost, owing to dust and dirt lodging on the lesion. Then we see flat, tolerably well-indurated disks of round or oval outline, which have a brownish-red margin which may be raised in a lip form. The greater part of the lesion is then covered with a chamois-skin-like or yellowish-brown or dark-brown crust.

These lesions have an average size of half an inch to an inch in diameter. In some cases their extent is even greater. About the cheeks they may develop into regular tumors of the size of a horse-chestnut or of half an apple.

Chancres of the general integument run a chronic, indolent, painless



PLATE IV.



Extra-Genital and Uterine Chancres.



course, and may last one or more and even six months before sinking down and fading away. They usually give rise to no painful symptoms, and early in their course they have no concomitant phenomena except the painless enlargement of the lymphatic ganglia of the region upon which they are developed. When they finally undergo resolution they leave pinkish, brownish-red, and brownish-black pigmented spots, with more or less atrophy and cicatrization of the skin, which last for a long time.

### Chancres of the Finger.

These chancres are found most commonly among surgeons, obstetricians, dentists, midwives, and nurses, male and female. In these individuals the infection is usually contracted in operations either upon a newly-made cut or an abrasion, excoriation of the skin, or upon some simple lesion present upon the skin, as, for instance, eczema and dermatitis due to the use of antiseptics and irritations. Among the laity chancres of the fingers are not very common, and they are usually the result of libidinous toying with the genitals of an infected woman. Finger-chancres also sometimes result from the bite of a person having syphilitic lesions in the mouth, and they have been known to follow a blow received upon the mouth of a person suffering then from specific lesions.

These chancres form on some part of the nail-margin, also on the sides and on the pulp of the finger and along its continuity. There is usually but one chancre—sometimes two, and rarely more.

On the finger we find the scaling papule or tubercle, the excoriated or ulcerated nodule or mass, the fungating chancre, and the panaritium-like chancre.

The scaling papule or tubercle is the rarest of all forms of finger-chañcre. It is usually found on the dorsal surface of a phalanx, and sometimes on the sides and palmar surface of the fingers. It begins as a papule, and runs its course as a tolerably well-circumscribed, indurated, and more or less scaly lesion of a dull coppery-red or purplish-red color. When near joints this chancre may become more or less exulcerated.

*The Excoriated or Exulcerated Nodule or Mass.*—This is the most common form of chancre of the finger. It is, as a rule, found near the tip of the finger. It usually begins as a small pustule, a minute excoriation, or as a fissure or hang-nail. The cell-growth increases rapidly, and the lesion in its early days is indolent and painless. In a few weeks the chancre becomes fully developed into a large, fleshy, smooth or granular, or even lumpy mass of dull-red color, sometimes with a purplish tinge. There may be density in the morbid tissue, but certainly no typical induration. Very often the chancre is soft and pulpy. These chancres, being exuberant in development, produce much deformity in the parts affected. Their shape depends on the site upon which they are developed. They are sometimes the seat of severe and continuous pain. If untreated or irritated, these chancres remain in an indolent condition for a long time.

*The Fungating Chancre.*—This form of finger-chañcre develops usually on the pulp of the organ and around the last phalanx. A warty or decidedly papillomatous mass, sometimes of much exuberance, is produced, which is indolent in its course and presents sometimes a very deep-



red color, and not uncommonly a purplish-red color, sometimes tinged with gray.

This form of chancre may be attended with more or less pus. Its course is chronic and indolent.

*The Panaritium-like Chancre.*—This chancre usually begins in the integument of the nail-margin in a cut or fissure or hang-nail or some inflammatory lesion. Soon an excoriated spot forms, which may be localized to one part of the nail-margin, or this latter may be wholly involved. When fully developed we find an encrusted or exulcerated swelling of more or less extent. The surface frequently becomes covered with a yellowish-green or dark-green membrane, and the thickening of the chancre extends to the parts beyond. This lesion is frequently attended with severe pain during its very chronic course. (See Fig. 6, Plate IV.)

In almost all cases of finger-chancre developed near the nail-margin or tip more or less of the appendage is destroyed, not infrequently its whole extent.

Much ultimate deformity is frequently produced by these finger-chrones, both in the nail and as to the symmetry of the pulp of the finger. In somewhat exceptional cases septic infections are concomitants of finger-chrones.

Usually the epitrochlear ganglion in anatomical association with the affected member is enlarged, often to a considerable size, varying from that of a nutmeg or that of a pea to that of a horse-chestnut. Sometimes there is no perceptible enlargement of the epitrochlear ganglia, in which event those of the axillæ are much swollen. There is usually swelling of the axillary ganglia concomitant to that of the epitrochlear ganglia.

In some rare cases the swellings of the epitrochlear and axillary ganglia go on to suppuration.

Cases of syphilitic infection of patients by surgeons, obstetricians, and midwives<sup>1</sup> having chancres on their fingers are not at all uncommon.

<sup>1</sup> A number of years ago I had under observation a whole family who became infected with syphilis through the finger of a German midwife, who had a chancre on her right index finger. This family consisted of the father and mother and four children, three girls and one boy. The wife had severe ulcerative lesions in the region of the fourchette, and the husband had three chancres of the prepuce and glans, while both suffered severely from buccal mucous patches and condylomata ani. The eldest girl, aged twelve, had a large chancre of the left cheek; the second girl, aged ten, a chancre of the lower lip; and the third child, a boy, had a panaritium-like chancre of the left index finger. The fourth child was a baby girl, who had a very superficial parchment-like chancre of the tip of the tongue. In these cases I convinced myself that the mother was infected by the midwife, the father received the infection from his wife, who by kissing infected the first, second, and fourth children, while the third child, the boy, infected himself by picking with his finger the chancre on the cheek of his eldest sister.

In this connection the following case is very interesting: Bardinet (*"Syphilis communiquée par le Doigt d'une Sage-femme," Annales d'Hygiène pub. et Méd. légale*, July, 1874) was appointed by the local authorities to investigate the causes and nature of an epidemic which appeared in the town of Brive, France. He ascertained that those affected were parturient women (or their relatives, such as husbands and children) who had been attended at childbirth by a certain midwife. Upon investigation and examination of her it was found that in February, 1873, she had an ulcer on the border of the nail of the right middle finger, which was afterward followed by syphilitic manifestations. The syphilitic chancre upon the finger was very obstinate to treatment, and continued in an ulcerated condition until the following October. In the mean time she had attended, according to her statement, fully fifty women in confinement. It was only determined that fourteen women were infected by her with syphilis, though it was suspected that

Such persons thus affected should not perform operations or make examinations upon any patients.

It is a peculiarly striking fact that physicians and surgeons are very slow to appreciate the nature of chancres on their fingers. They usually delude themselves with the idea that their lesion is a simple one, though obstinate in its course, and they consider it due to some infection other than that of syphilis or an anatomical ulcer. In the majority of cases it will be found that when a physician, surgeon, dentist, obstetrician, or midwife has a small (or even large) indolent sore on his or her finger, the lesion is indicative of syphilitic infection. It is a good rule always to be suspicious of an indolent sore on the finger of a professional person.

In some rare cases chancres of the finger become contaminated with infectious material and more or less severe pyæmia or septicæmia appears to complicate the case.

### Chancres of the Lip.

Chancres of the lip are quite common. They are usually seated on the vermilion border, sometimes on the inner border, and again on both

others were likewise contaminated, and that they concealed the matter from motives of shame and secrecy. The following are the facts: Between February 28th and March 15th she cared for three women, who became syphilitic. Between the latter date and June 28th, though she attended a number of women, no cases of syphilis could be ascertained to have occurred. From this date until October she attended fifteen more women, of whom only one escaped syphilis. It is suspected that in the interval of six weeks during which no cases of infection are noted such did really occur, but that they were hushed up; again, it was thought that perhaps during this period or a part of it the digital ulcer did not yield an infecting secretion, owing to the applications which were then made. Eight of the husbands of the fourteen women who thus became syphilitic were also infected, as well as nine infants of the latter, four of whom died of syphilis. Thus we certainly have a total of thirty-one cases of syphilis, out of which there were four deaths, caused by one woman who had a chancre on her finger. It is thought, however, that the actual number was nearly one hundred. The fact of the infection having originated from the woman's finger was very clearly established, but in the cases of several of the children it must be confessed that the syphilis underwent a rather early evolution.

The conduct of this midwife cannot be commented upon too severely, for she evidently knew of the serious nature of the disease which she was communicating, yet her cupidity incited her to continue her ministrations. She was tried, found guilty, and sentenced to a mild fine and two years' imprisonment.

Fritsch states that he had known eight midwifery assistants (young medical men) who suffered from digital chancres, and that he knew of one woman who was infected with syphilis by one of them.

As an historical fact it may be of interest to mention that in 1727 an epidemic of syphilis broke out in the little village of Sainte Euphémie, in the department of Drôme, France. This epidemic has been chronicled in history by Jean Bayer under the title *Mal de Sainte Euphémie*. This scourge, it is stated, had its origin in a pustule upon the right index finger of a midwife. During four months this lesion, accompanied with painful swelling of the arm and a generalized rash, existed, and all the time the woman exercised her calling. More than fifty women, her immediate victims, were infected upon the genitals, and from them the disease spread to their husbands and children. Though the course of the syphilis in all the cases was very severe, there is no mention of a fatal result.

Brambilla ("Caso importante de infectione sifilitica." *Gazetta Medica Italiana Lombardia*, No. 24, 1877, p. 231) reports the case of a midwife who became infected upon the left thumb, and had very severe generalized syphilitic symptoms and manifestations. She was treated and promptly cured, and there is no evidence that she, on her part, communicated the disease to any one else. This observation is rendered the more interesting by the fact that confrontation was accomplished, and the person from whom the midwife received the infection was found to have four ulcerated papules of the vulva and anus and bi-inguinal adenopathy.

the vermilion border and the skin. They may be seated on the cutaneous portion of the lip alone. These chancres are rarely seen early in their course, since their nature is frequently unrecognized until they have reached full development. They begin as small round or oval excoriations or as fissures, and are at first looked upon as cold sores or cracks of the lip.

It sometimes happens that a minute excoriation or small fissure will run a very ephemeral course, and disappear in a week or ten days without having or leaving after it any induration. In these cases the only early signs of syphilitic infection is the marked enlargement of the submaxillary and sublingual glands, which may be so extensive as to constitute a temporary deformity. But in most instances chancre of the lip goes on to full development, producing a raw, eroded, flat plaque or nodule, whose shape is in conformity with the arrangement of the parts, or an encrusted lesion is produced. (See Fig. 1, Plate IV.)

The color of the membrane covering these chancres is of greenish-cream or deep-green color, which is oftentimes so darkened by minute hemorrhages that a dark-brown crust is left. In many cases the lip-chancere is tolerably well defined, sometimes resembling the rounded nodule seen on the penis; then again the chancre is spread out along the vermilion border. The amount of induration varies in some cases. In the ephemeral chancres it cannot be felt; in other more chronic chancres it is moderate, but somewhat doughy, while it may be found even of great extent and of ligneous hardness. (See Fig. 2, Plate IV.) These chancres cause much discomfort by their presence on the lip, and the concomitant engorgement of the glands is often a source of annoyance and even pain. They often give rise to a quite profuse viscid secretion.

### **Chancres of the Tongue.**

These chancres have not clearly-marked features. They appear as tolerably well-circumscribed nodules either at the tip or on the lateral portion. Their surfaces are red, eroded, sometimes covered with a milky pellicle, frequently uneven and traversed by minute fissures. Their nodular character, chronic indolent course, and external features point to their nature. The submaxillary glandular enlargement aids in making the diagnosis. It must be remembered that cancer of the tongue begins in a little nodule, perhaps warty in appearance, and is soon complicated by glandular enlargement. In persons under forty or fifty years it will generally be found that the tongue-lesion is of syphilitic origin. In middle and advanced age the probabilities are greater that the lesion is cancerous than syphilitic. In these cases every phase should be carefully studied in order that a correct diagnosis may be made.

### **Chancres of the Gums and of the Hard Palate.**

These lesions are very rare indeed, and several cases reported as such were undoubtedly those of hypertrophic mucous patches. The surgeon should examine and think long before pronouncing as chancre localized red thickening of the mucous membrane of these parts. When they exist these chancres are simply hypertrophied chancrous erosions, the



so-called *ulcus elevatum*. Owing to the condition of the parts, it is difficult to determine the extent of the induration. As a rule, these lesions cause little trouble and are attended with scarcely any pain when unirritated. When seated near the margin of the gums they may be attacked by ulceration.

### Chancres of the Tonsil.

These chancres are now known to be sufficiently common. The comparative frequency to-day of the tonsillar chancre is due to the fact that its existence is now well known and that surgeons are on the lookout for it. I have seen fully eighteen cases and perhaps more.

The tonsillar chancre never presents a definite typical appearance, since the tissues upon which it is seated differ in each individual. Whatever may have been the conformation of the parts, whether moderately smooth or more or less anfractuous, so will the chancre-lesion be but an exaggeration of that condition, due to hyperæmia and hyperplasia of the parts. Examination is difficult in all cases, particularly so in some. When accessible to the finger-tip, the tonsil-chancre will feel quite hard, brawny, and may even be cartilaginous. In some cases the new growth is tolerably well circumscribed; in others it is quite diffuse, involving a whole tonsil and some of the tissues around it. The surface of the chancre may be simply red and superficially eroded; it may be covered with a milky-looking membrane, in which case it may look like a mucous patch; then, again, a dull-green membrane of considerable firmness may cover the lesion.

In most instances there is but one chancre, involving more or less of one tonsil. I once saw a case in which there was a well-marked chancre on each tonsil. Then, again, I saw during its whole course a chancre which involved the two tonsils and the posterior pharyngeal wall. At about the time this case was under my care a colleague sent me a similar one for diagnosis.

These chancres usually become troublesome quite early in their course. The patients complain of pain, uneasiness, and of a difficulty in swallowing. Sometimes the suffering is very great. Then the submaxillary, sublingual, and lymphatic ganglia swell up very much indeed, so as to produce large-sized bunches in the neck. These by their size impede motion and deglutition and add materially to the patient's suffering. The ganglia become matted together into hard, firm, indolent masses. In some cases the pre-auricular ganglia are enlarged.

Such is the deformity of the parts, and so great is the discomfort of patients with these chancres, that it may be necessary to begin treatment before the date of evolution of the secondary state. Usually these lesions yield promptly to energetic treatment.

The diagnostic features of these chancres are—the history of the case; the slow, painless enlargement of the cervical ganglia; the unilateral seat (usually) of the lesion and its appearance; the absence of chancre elsewhere, and the markedly less engorgement of the ganglia of other parts of the body; and, later on the evidences of constitutional syphilis.

### Chancres of the External Ear.

Chancres of the ear are very rare. In Bulkley's statistics of 9058 cases of extragenital chancres, derived from all sources, there were 27 cases of chancres of the external ear. The parts which have been found to be affected are as follows: the auricle, the lobule, the integument over the mastoid process, and the base of the tragus. Chancres of the ear are of the dry, scaling, erosive, or encrusted forms.

The pharyngeal orifice of the Eustachian tube has been found to be the seat of chancre, resulting from catheterization by means of instruments soiled with syphilitic material.

### Chancres of the Eyelids.

These chancres are not common, although there are many cases reported in literature. They are found on the free margin of either lid or the adjacent integument continuous with them, and also on the inner surface of the palpebral mucous membrane. They are usually of the erosive type, with either slight or decidedly marked induration, which, however, does not spread much around the original lesion. Fig. 3 of Plate IV. will give a very clear idea of these palpebral chancres. The creamy-green color of the membrane covering the chancre is well shown.

Chancres of the eyelids are always accompanied by painless hard enlargement of the pre-auricular ganglia, and generally by a marked enlargement of the cervical ganglia of the corresponding side of the face. As a rule, a sharply-defined nodule or plaque remains for a time after the healing of the chancre.

Krefting<sup>1</sup> gives the statistics of 2916 cases of chancres, of which 539 were instances of extragenital infection. Of these extragenital chancres, 292 were in adults (61 men and 231 women) and 247 were in children (117 boys and 130 girls). Out of the 1354 in men, there were only 61 cases of extragenital chancres, which is about 4.3 per cent., while in women the proportion of these chancres was 12.8 per cent. The seat of the extragenital chancres was noted in 280, as follows:

Lips and buccal commissures,	143 cases—35 men, 77 women, and 30 children.
Gums . . . . .	1 case — 1 man.
Tongue . . . . .	11 cases— 3 men, 3 women, “ 5 “
Pharynx . . . . .	58 “ — 9 “ 43 “ 6 “
Breasts . . . . .	58 “ — 58 “
Chin . . . . .	1 case — 1 woman.
Forehead . . . . .	1 “ — 1 “
Scalp . . . . .	2 cases— 1 man, 1 “
Popliteal space . . . . .	1 case — 1 “
Abdomen . . . . .	1 “ — 1 “
Fingers . . . . .	4 cases— 3 men, 1 “

It will be noted that in three-quarters of these cases the infection was in and about the mouth.

Extragenital chancres being really accidents, their occurrence is largely determined by the habits and customs of the people infected. In

<sup>1</sup> “Extragenitale Syphilisinfection, 539 Fälle,” *Arch. für Derm. und Syph.*, 1894, vol. xxvi. pp. 167 et seq.

contrast with Krefting's statistics, those of Salsotto<sup>1</sup> are interesting. In 201 cases there were 2 of chancre of the anus, 1 of the thigh, 2 of the inguinal region, 108 of the breast, 2 of the chin, 2 of the upper eyelid, 2 of the cheek, 1 of the forehead, 2 of the fingers, 12 on the arm, 1 on the back, 2 on the tongue, 1 on the gums, and 61 on the lips. In this collection no case of chancre of the tonsil was noted.

## CHAPTER LV.

### GENITAL AND EXTRAGENITAL CHANCRES IN WOMEN.

CHANCRES of the genital organs are very common in women, but extragenital chancres occur in them much more frequently than they do in men.

Chancres in women are usually far less regular in their course than they are in men. In many women the chancre is so small, benign, and ephemeral that it may never be seen, or, if seen, its nature is usually not suspected. In very many cases, even when the lesion is strikingly apparent, its nature remains for a long time in doubt, owing to inflammatory complications and to a want of striking individuality in the lesion itself. Then, again, simple inflammatory processes and chancroidal ulcers often become upon the female genitals so complicated and obscure in appearance that they may resemble specific lesions. In women induration as a symptom is not so generally observed as it is in men. In some females it can scarcely be appreciated by careful examination, and it may be very transitory in its duration, whereas in others it attains large proportions, lasts for indefinite periods, and may lead to ultimate deformity. In men the chancre is readily examined. In women this lesion, owing to the nature, inadaptability, and inaccessibility of the parts, is very difficult of examination except on protruding portions of the genitals.

In the majority of cases there is but one chancre, but in fully one-third of the cases the lesion is multiple. There may be two or three, and rarely more than eight, infecting chancres in one woman.

The main reason why chancres in the female are so little understood, are so frequently unrecognized, and generally offer so much difficulty in diagnosis is that there is very little chance for their study on a large scale.

As in men so in women, the chancre is simply a localized aggregation of a peculiar new specific cell-growth. For clinical purposes we may divide genital chancre in women into the following varieties: the superficial or chancrous erosion; the scaling papule or tubercle; the elevated papule or tubercle (exulcerated), *ulcus elevatum*; the incrustated chancre; the indurated nodule; the diffuse exulcerated chancre.

This division, which is clinically correct, may at the first sight seem

<sup>1</sup> *Sifilomi Extragenitali ed Epidemie di Sifilide*, brochure, Turin, 1892.



puzzling, but it offers a basis for study and observation, and its simplicity will be appreciated as the experience of the observer widens.

### The Superficial or Chancrous Erosion.

The most constant early appearance of the syphilitic chancre in women is seen in the form of an erosion of the mucous membrane. In its very early days this lesion presents no well-marked characteristics, and is very liable to be mistaken for a ruptured herpetic vesicle, an abrasion, chafe, or scratch. Such is its seemingly benign, superficial, and aphlegmasiac character and small size that its nature is frequently not determined at the first examination. Indeed, as Fournier says, "nine times out of ten the nascent chancre is not recognized as such."

The chancrous erosion is always found on the surface of the mucous membrane. It begins as a red spot, somewhat deeper in color than the mucous surface on which it is seated. It is very rarely, if ever, seen in women in the first few days of its existence, for the reason that its presence is usually unknown to its bearer, or, if it is seen by her, it appears so simple, mild, and harmless that its nature is scarcely ever suspected. Thus it is that when first seen by the physician the red spot has become, by desquamation of its epithelium, an erosion. When seated on smooth surfaces, such as presented by the internal surfaces of the labia majora and the greater part of the labia minora, this lesion, when somewhat advanced, presents certain well-defined features, but when it is developed upon the anfractuons surfaces of the fourchette, the introitus vaginæ, the vestibule, and around the urethra, its appearance is not striking, and indeed is often misleading to the eye, while its exploration is difficult and unsatisfactory to the fingers. In very many cases a catarrhal or blennorrhagic condition of the parts conduces to further obscurity of the diagnosis.

When the erosion is quite well developed, it presents the appearance of a very superficially exulcerated lesion of a more or less deep-red color, resembling quite closely muscular tissue. This color, however, varies in different cases between certain extremes. In very cleanly and anæmic women the redness may be scarcely deeper than normal, while in uncleanly persons, in those suffering from simple or blennorrhagic inflammation of the genital tract, in those in whom the coaptation of the parts is close and tight, and in pregnant women the chancre may be of an extremely deep dull-red tint.

Upon smooth, tolerably flat surfaces the chancrous erosion is usually round or oval in shape, though either of these outlines may become irregular. On anfractuons surfaces the chancre presents corresponding irregularities. The surface of the chancre is smooth, sometimes even glistening and shining, and shows that the lesion is formed of tolerably compact tissue. It usually presents a solidity of structure which is striking. When seated upon parts in which the chancre is subjected to movement, or in clefts, the smoothness of surface may be more or less lost.

The secretion of the chancre is usually serous in character, but it may also contain some leucocytes. It varies in quantity considerably: from some chancres we see very little serous oozing, while from others it is quite copious. When seated on an inflamed surface or when the chancre is irri-

tated it may secrete true pus. In some cases these chancres become contaminated with chancroidal pus, and they are then converted into ulcers whose nature it is very difficult to determine.

The true chancrous erosion scarcely presents an appreciable elevation, and the lesion may run its course and disappear without ever becoming salient above the normal plane.

While in general there is not a well-defined margination of the chancrous erosion, the eye can plainly see where the lesion ends and where sound tissue begins. In some cases, however, the circumferential margin becomes hyperplastic and the chancre is converted into a saucer-shaped lesion. The size of these chancres varies considerably: some reach maturity and have a diameter of a third or half an inch, and it is not common to see one larger than an inch in diameter.

In many cases, even when a satisfactory examination is possible, no evidence of induration can be made out, and at best soft, œdematous hyperplasia may be felt. In other cases, however, induration of a superficial, flat character—parchment induration—can be felt.

In many instances the chancrous erosion runs its whole course as a non-salient lesion, but in others the erosion gradually develops into a papule or tubercle, the description of which will soon follow.

While in general the chancrous erosion is with difficulty diagnosed in its early days, if it is protected from irritation and dirt and carefully watched, its nature may be determined in the course of ten days or two weeks, if not sooner. Herpetic disks, chafes, and excoriations usually show a tendency to become rapidly cicatrized by the simple interposition of lint or of a mild astringent wash, and from the first they usually show signs of healing. On the other hand, despite judicious aseptic measures, the chancrous erosion in most cases keeps on its course without any early signs of healing. With this lesion the implication of the ganglia can usually be well made out in about two weeks, and this sign, with the typical appearance of the lesion, will usually make the diagnosis of syphilis clear.

Chancrous erosions, when seated upon the surfaces of the labia, large and small, are very commonly multiple, varying in number from two to four, and even to six and eight in some cases.

The chancrous erosion upon uneven and anfractuous surfaces is even more difficult of recognition than the lesions just considered. Upon the carunculæ myrtiformes, about the urethra, at the fourchette, and around the vaginal orifice the lesion rarely has a definite shape and outline. As Clerc says, the syphilitic neoplasm moulds itself to the parts it is seated upon, and when these parts are uneven, nodular, fringed, and anfractuous, its shape, outline, and general configuration are vague and indeterminate.

The **diagnosis**, at best being very difficult, it is often rendered more obscure and even impossible by underlying chronic and acute inflammatory conditions of the vagina and vulva. I have many times seen this form of chancre thus located pass wholly unrecognized by careful and skilled men in the cases of women suffering from simple and blennorrhagic inflammation of the genitals. In practice the best course to pursue when one is consulted for or sees a deep-red, superficially eroded patch, or even papule of irregular outline, on the parts just mentioned, is to keep them free from all irritation and apply a bland lotion on cot-

ton. If the lesion is simple in character, it will soon become pale and heal, but if it is composed of syphilitic cell-growth, it will keep on in most instances and become further developed. Time, watchfulness, and the condition of the ganglia will within three weeks certainly make the diagnosis clear. It follows, therefore, that the physician should speak guardedly of these lesions, and that he should never pass them over as insignificant or pronounce them offhand as being of no moment.

A frequent and striking peculiarity of the chancrous erosion is its short period of existence. It frequently comes and goes without the knowledge of its bearer. Physicians, young and old, are often much surprised that on female subjects presenting early secondary lesions they can find no trace of the chancre. Not only does this lesion frequently undergo rapid involution, but it may also leave after it no trace after the lapse of a few days. Fournier watched a chancrous erosion run its course in fourteen days and leave after it no trace. I recall the case of a woman who had a pea-sized erosion in the cleft formed by the labium majus and the labium minus which I watched carefully, and in which the chancrous lesion lasted eighteen days and disappeared without the slightest perceptible trace.

Sometimes on the involution of the chancre a reddened, very slightly hyperplastic spot is left, and one can tell that the affected tissue is slightly denser than normal. Then, again, the only trace left is a circumscribed redness, at first rather deep. This gradually pales, and the mucous membrane is left apparently healthy. While in many cases the chancre is very ephemeral and leaves a trace which rapidly disappears, in other cases the red spot is very persistent, and it may be seen for several months.

The chancrous erosion usually leaves no evidence of a cicatrix: the reason of this is that the syphilitic new growth composing it is not copious and condensed; consequently, it does not destroy or impair the tissue which it infiltrates, and is absorbed without carrying away with it any normal cells. This lesion, however, is sometimes accompanied with an œdematous condition of the tissues under and around it. This complicating condition consists in a slow, aphlegmasic thickening of the tissues. It may be limited to a moderately wide area around the sore, or it may be extensive and involve much tissue. It is not at all uncommon to see the whole of a labium minus or majus the seat of this indurating œdema. Tissues thus affected present a dense, firm, and somewhat elastic structure, but the induration in its early periods is not as hard as that of a typical initial sclerosis.

It not infrequently happens, particularly when the chancrous erosion is seated near the integument or upon the fourchette or prepuce of the clitoris, that well-defined induration takes place under it, and it becomes developed into a typical indurated chancre. This condition is sometimes strikingly well marked at the fourchette, where it frequently presents a raw-beef appearance, which is very characteristic.

### **The Scaling Papule or Tubercle.**

This lesion is found upon the outer surface of the labia majora; upon the labia minora when they are long and their stricture resembles that



of the integument; upon the prepuce of the clitoris when it is long and protrudes from the vulva; upon the internal surface of the thighs, the inguinal folds, and the hypogastrium. It begins in a very insignificant manner as a small, dull-red colored papule, which may or may not be scaly. This lesion increases circumferentially, but usually does not become much elevated. As it grows it develops into a flat, brownish-red and sometimes purplish-brown, perhaps scaly, elevation of the skin, with a sharply-defined margin. It may be of the size of a split pea, of a silver five-cent piece, or, when on a flat cutaneous surface, as large as a silver quarter- or half-dollar. Its shape is round or oval, and sometimes, owing to the conformation of the parts, it is of irregular outline. It may present well-marked induration or this symptom may be scarcely recognized. In general this lesion is unique, and exceptionally two or three are found. Though it is cold and aphlegmasic in appearance, it presents to the eye a compactness of structure giving one the impression that it has come to stay. It runs an indolent course, and may last several weeks or even months. It then sinks down and withers. In most cases it leaves after it a deep-brown, even a purplish, stain, and not uncommonly atrophy of the skin is produced by it. When irritated this lesion loses its epidermal covering and becomes raw and exuding. It then is developed into what is called the ecthymatous chancre (a bad term), and may be better classed as an incrustated chancre. This form of chancre is far from uncommon in women.

In rare cases the scaling papule becomes very large in area and very much elevated, so as to form what we may call an elephantine chancre. I have seen one on the buttocks of a woman the diameter of which was two inches and a half, and another on the upper portion of the thigh which had an area of an inch and a half and a height of three-quarters of an inch.

In rare cases the scaling papular chancre develops around a hair and forms a conical lesion of the color just described. When this occurs it is not uncommon to see two or three, or even more, of these chancres. They may run an uncomplicated course, or they may become attacked with ulceration, in which event the **diagnosis** is much obscured, and a lapse of time is required before their nature is rendered clear and positive. The resulting ulcers have well-defined, elevated edges and a saucer-shaped surface. They vary in size from a third to half an inch. All chancres of this variety are rather slow in disappearing.

### **The Elevated Papule or Tubercle (Ulcus Elevatum).**

This chancre presents the appearance of a well-circumscribed, flat, or elevated lesion whose surface is similar to that of the chancrous erosion. Indeed, it may be defined as a chancrous erosion in which the hyperplastic process has been very active and productive of much infiltration. Cases not infrequently present themselves in which we can watch the development of the *ulcus elevatum* from the chancrous erosion.

The *ulcus elevatum* is seen upon the mucous surface of the labia majora and minora in its most typical type. This form of chancre is round, oval, or slightly irregular in outline, and varies in size from

a third of an inch to an inch, and even an inch and a half. Its surface is smooth and even velvety, and its color is of a deep red, like muscular tissue. In some cases the smoothness of surface is replaced by an uneven, slightly granular condition, but in uncomplicated cases nothing like a warty or strawberry surface is seen. In old and irritated cases of the *ulcus elevatum* a slightly warty appearance of the surface may be present. In other cases, as the lesion grows old, it assumes the appearance of *condylomata lata*. The surface may be flat, slightly convex, or even decidedly concave. As a rule, the margination of the *ulcus elevatum* is not sharp and steep, but in some cases this feature is observed. The secretion of this lesion is serous in character and is mixed with a few leucocytes. In consequence of the irritation of catarrhal or blennorrhagic secretions, as a result of uncleanness and alcoholic and sexual excesses, and of prolonged walking and fatigue, the *ulcus elevatum* may become much hypertrophied, and around it may develop a varying amount of indurating œdema; or, from the same causes, it may become more or less ulcerated, in which event its nature is often rendered very obscure. A hyperæmic condition of the parts around, due to pregnancy or any other source of irritation, is very often a complication which obscures and delays the diagnosis.

Careful palpation rarely shows very marked induration in the *ulcus elevatum*. This symptom is usually difficult of detection, and when found it is generally of the parchment-like order, or it simply gives the impression of a rather greater condensation of tissue than is normally found. When this lesion is situated near the juncture of the mucous membrane and the integument, it may present marked induration. As a rule, this form of chancre is chronic in its course, lasts weeks and months, and slowly resolves, leaving a deep-red spot which may be very persistent and is often very useful in diagnosis. In some cases a cicatrix is left.

### **The Incrusted Chancre.**

This chancre, as we have seen, is not uncommonly found upon juxtapudal cutaneous surfaces, and indeed upon any portion of the integument. It has been stated that incrustated chancres are, as a rule, not found within the area of the mucous membrane of the vulva, but that their habitat is the tegumentary structures. It is true that in most instances vulvar chancres are of the erosive or papulo-tubercular variety. This is largely due to the fact that the coaptation of the parts and their moisture, aided very often by pathological secretions, cause any surface covering of the chancre to melt away and to disappear. But it is not at all uncommon to find chancres at the fourchette in an incrustated state, and I have twice seen this condition in vaginal chancres. Further, in somewhat rare cases I have seen incrustated chancres of the clitoris, and also of the labia minora, when these structures have been prominent in the vulva and have come to look like integument.

At the fourchette, besides the raw-beef chancre—the outcome of the chancreous erosion—we not uncommonly find incrustated chancres.

The incrustation in women, as in men, forms upon an eroded surface—namely, the chancreous erosion, the indurated nodule, or the diffuse indu-

rated plaque. It begins, as it does in men, as a thin, white film, presenting a glistening appearance, and becomes of a greenish-creamy tint.

Then, again, in women, as in men, the surface of the chancre may be covered with a thin, brownish-red, necrotic-looking film, which consists of the usual membrane discolored with blood, which may be scattered in little masses over the surface of the chancre, giving it a spotted appearance.

Further, we find, though very rarely, the chancre called by Fournier<sup>1</sup> *chancre multicolore* or the *chancre en cocarde*, in which the surface of the chancre presents a series of concentric zones of different colors which are thought to resemble a cockade. This play of color is due to some peculiar changes in the typical syphilitic membrane of the chancre.

The incrustated chancre may present a smooth surface or it may be more or less uneven and undulating, owing to the nature of the parts upon which it is seated.

When it is developed among the hairs, the infiltrating neoplasm causes little elevations around the hair-follicles; as a result, the surface of the chancre is quite uneven. This is the usual condition of chancres when developed upon hairy parts.

In the incrustated state the chancre may remain indolent and aphlegmasic for a long time. As the lesion becomes old it is not uncommon to find that it is complicated with a greater or less amount of indurating œdema. Under proper medication the crust disappears and healing takes place in the chancre. A cicatrix is usually left.

### The Indurated Nodule.

This chancre, so common in men, is very rare in women. In men the syphilitic neoplasm or nodule, as a rather general rule, becomes circumscribed in compact form into a little mass; in women this new growth tends to diffuse itself more loosely into the soft mucous tissues. Thus it is that we rarely see the indurated nodule in the female sex, except on parts where the skin and mucous membrane fuse together.

The indurated nodule is seen as a sharply-circumscribed mass of indurated tissue, which may be rather broad and flat, or it may have a rather narrow base, sloping edges, and flat surface. The color of the lesion is dull red, and its surface may be smooth and glossy, or it may present the grayish color of the incrustated chancre, with all the variegations found upon that. This nodule, like most of its class, may have a cartilaginous hardness, sharply limited to its margin. The course of this lesion is very chronic, and on its disappearance a pigmented spot may be left or atrophied skin may be evident.

### The Diffuse Exulcerated Chancre.

This lesion is observed not infrequently in women of the lower order who are uncleanly in their habits and given to debauches. It presumably begins as the chancrous erosion develops into the *ulcus elevatum*, and from this stage it further increases. It is usually seen involving more or less of one lip, large or small. The morbid area is much thickened, of a

<sup>1</sup> *Leçons cliniques sur la Syphilis chez la Femme*, Paris, 1881, pp. 32 et seq.



deep-red color, and it is exulcerated over the greater part of its surface. In these very large chancres we find a raw, uneven surface, and very often small or large ulcerating spots. Their course being very chronic and indolent, their appearance varies. Sometimes they are raw like beef, and at others they look like elephantine incrustated chancres. They are very often complicated with the development of hard œdema, in which case, from their chronicity, their papillomatous appearance (if present), and great density, they may be mistaken for epithelioma.

As a rule, all chancres of the female genitals are unaccompanied with pain. In some cases itching and burning are complained of, and in some chancres of the clitoris and fourchette severe pain may be felt.

On the labia majora we find the incrustated chancre, the chancrous erosion, the *ulcus elevatum*, the diffuse exulcerated chancre, and the indurated nodule. In the tissues of these parts indurating œdema is very often observed as a complication involving large and small portions. This complication is also found as a result of secondary lesions, such as erosions and *condylomata lata*.

On the labia minora the chancrous erosion, the *ulcus elevatum*, and the diffuse exulcerated chancre are commonly found. All chancres on these parts may be accompanied by mild or dense induration, which may involve a part or the whole of the structure.

Chancres of the preputial covering of the clitoris are of the erosive or incrustated types. Very often they are very hard, and, as Fournier says, the clitoris sometimes feels like a miniature ramrod.

Chancres of the fourchette are of the erosive, incrustated, or diffusely indurated type.

Chancres of the introitus vaginae, meatus, and myrtiform caruncles are commonly ill-defined masses of induration which frequently present no characteristic appearance, and whose diagnosis is usually very difficult, and frequently only possible after considerable delay and observation. On these parts it is very difficult, often impossible, to determine the extent and density of the induration.

### Chancres of the Vagina.

These are very rare, and when found they are usually within an inch of the vaginal ring. They are found on the anterior and posterior walls in the form of erosions with considerable hardness or in the incrustated state. Usually there is but one chancre; sometimes there are two. Clerc<sup>1</sup> states that he never saw a chancre of the vagina, and Fournier says that he never saw one. I have reported and figured<sup>2</sup> a case of chancre of the vagina in which there was one lesion in the sulcus to the right of the bladder, an inch within the vaginal ring, and another in the left sulcus, which was fully three inches up. In this case there was a well-marked chancrous erosion at the fourchette—in all, three chancres, two in the vagina and one at the fourchette beyond the vaginal ring.

<sup>1</sup> *Traité pratique des Maladies vénériennes*, Paris, 1866, p. 101.

<sup>2</sup> "Genital Chancres in Women," *New York Med. Journal*, Jan. 2, 1892. To this paper is added a chromo-lithographic plate of figures representing the various forms of chancres found about the female genitals.

Gardillon,<sup>1</sup> in his thesis, reports four cases, in one of which the chancre was on the posterior wall well up. A very interesting case is reported by Bockhart,<sup>2</sup> in which the chancre was seated in the middle of the posterior wall. The lesion was contracted from a syphilitic man who used a so-called stimulating condom, which so excoriated the vaginal wall that infection took place. In all probability, the thickness and density of the vaginal epithelium in most cases offer a barrier to syphilitic infection. Two interesting cases of vaginal chancre are reported by Binet.<sup>3</sup>

The diagnostic points in these chancres are—their round or oval form, their limited area, their sombre color, their sharply-defined borders, which are usually slightly elevated, never punched out, as is a chancroidal ulcer; their parchment-like induration, indolent character and painlessness, and their scanty secretion. If these features are borne in mind, a diagnosis may generally be made.

### Chancres of the Os Uteri.

The appearances and clinical history of these chancres are now quite clearly understood. They are now more carefully looked for, hence they are no longer so rare as they were supposed to be. Their occurrence, however, is far from common.

They are seated either on the anterior or the posterior lip of the uterus, perhaps more frequently on the former than the latter. On these sites they may extend up the inner surface of a lip, even into the uterine cavity. In some cases the chancre surrounds the os and involves a portion of the inner surface of the lip.

As a rule, but one chancre is found, and rarely are two seen. (See Fig. 4, Plate IV.)

The chancre of the os appears as a round, an oval, or clover-leaf-like excoriation or elevated papule or nodule. In many cases the lesion is the chancrous erosion or its exaggeration, the *ulcus elevatum*.

The surface of the chancre is in accord with the anatomical conformation of the parts. It is usually smooth, sometimes slightly granular, and, when the lesion is old, its surface may be decidedly mammillated. There may be no distinct line of margination, and then, again, a sharply-defined ring of circumvallation may be seen. While, in many cases, these chancres appear decidedly like erosions, in some they may be covered with a distinct false membrane, which may be of a greenish-cream color, of a deep-green, or a greenish-brown, or even of a light-brown color. This membrane may be smooth and of seemingly uniform structure, and then, again, it seems as if composed of minute meshes of tissue.

The secretion is usually scanty and serous, but in some cases, particularly in those of a damaged and inflamed os, it may be sero-purulent.

The lesion runs an indolent course, and is unattended with pain or any discomfort. Fournier, however, speaks of one case in which suprapubic pain seemed to be symptomatic of a chancre of the os. The same author noted in five cases of chancre of the os vulvar and perivulvar

<sup>1</sup> *Essai sur le Chancre du Vagin, etc.*, Paris, 1881.

<sup>2</sup> *Monatshefte für Prakt. Dermatologie*, No. 12, 1885, pp. 417 et seq.

<sup>3</sup> *La France médicale*, p. 38, 1881.

herpes, and he thinks that the presence of these lesions should always suggest the possible syphilitic character of the uterine ulcer.

Enlargement of the inguinal ganglia is usually a concomitant of the development of this form of chancre.

Owing to the inaccessible position of the uterus, the utmost difficulty is often experienced in palpating and examining chancres of the os. In some cases, however, the organ hangs low in the pelvis, and the lesion can be reasonably well palpated by the finger-tips. Even when thus accessible, it is often difficult, owing to the density of the uterine tissue, to say positively that the syphilitic lesion is indurated. In some cases, however, induration of a decided character can be made out, though it may be very difficult to determine its exact extent. In the classical case reported by Ricord, in which a hard chancre was seated on the os of a much-prolapsed uterus, examination was as easily made as upon the penis of a man; and that surgeon says that it was chondroid or ligneous in structure.

As a rule, chancres of the os run a slow, aphlegmasic course, and disappear very slowly. Rassumow,<sup>1</sup> who saw 117 uterine chancres in 1374 cases of venereal sores on various portions of the pudenda of women, found their cure was more protracted than any other form of venereal sore. On the other hand, in somewhat exceptional cases, as Fournier remarks, the duration of this chancre is very short, and in a little time all localized traces of it are lost. The duration of uterine chancres, like that of similar lesions of the lip, penis, and vulva, often depends largely upon the extent and depth of the infiltration.

Thus the new growth may be scanty and superficially developed, involving the mucous and submucous tissues only, and then it may disappear rather precociously. Then, again, the neoplasm may be exuberant, infiltrating the tissues down to and into the muscular structure,<sup>2</sup> in which case there is a well-marked extensive lesion which will persist for a long time in an indolent manner.

Uterine chancres are sometimes accompanied by hard œdema, by which the neck of the organ may be much hypertrophied. In this feature of hypertrophy these chancres resemble particularly some of those of the lip, vulva, and penis. Then, again, the new growth may be well circumscribed, in which event the os uteri is not much enlarged.

As a result of this involution of these chancres, in some cases cicatricial bands or masses of the os uteri are left, and the sclerotic conditions may give rise to dystocia of various degrees.

### Chancres of the Breast.

Chancres are found upon the female nipple, upon its areola, and rarely upon the integument beyond the areola. These chancres are particularly interesting both as to their mode of origin and their clinical history and the consequences they may entail.

<sup>1</sup> "Zur Statistik der Schanker der Vaginal-portion," *Vierteljahresschrift für Derm. und Syphilis*, vol. xii., 1880, pp. 517 et seq.

<sup>2</sup> The pathological anatomy of a hard chancre of the uterus is described and pictured by Mracek: "Ueber die syphilitische Initialerkrankungen der Vaginal-portion," *ibid.*, vol. xiii., 1881, pp. 47 et seq.



These chancres are of the erosive and incrustated types, and sometimes they exist as indurated fissures.

Upon the nipple the chancre forms a flat plaque of varying size or a distinct nodule involving part or all of the appendage. When the woman does not give the breast to her child, the chancre shows a tendency to become incrustated, but during nursing moisture keeps the parts in an eroded condition.

Chancres very commonly form in the furrow at the base of the nipple, and then they assume shapes resembling segments of circles, and sometimes they are completely circular in form. These chancres are most commonly of the incrustated variety.

Chancres of the areola are usually small round or oval erosions, sometimes flat, again elevated, or they may be saucer-shaped and slightly depressed below the normal plane. Very rarely do these chancres become incrustated. In this situation it is rather more common to find several chancres than one. There may be six or eight, or even as many as sixteen, of these chancres. In some cases these lesions are found on both breasts.

The indurated fissure is not commonly seen. It is really the nipple chancre complicated with one or more very well-marked fissures.

In the majority of cases of chancres of the breast the infection is derived from hereditarily syphilitic children, in whose mouths mucous patches are seated. This mode of infection occurs chiefly in hospitals and in lying-in-asylums, in which vigorous and healthy lactating women are made to nurse one or more children besides their own. Owing to carelessness in examination on the part of the visiting staff or of the internes of these institutions, the buccal lesions of syphilis in some nurslings are overlooked or wrongly diagnosticated as of simple nature, and as a result some luckless woman whose duty it is to nurse these infants becomes infected with syphilis. I had under observation many years ago the case of a woman who was thus infected in one of our city institutions, and in the essay<sup>1</sup> in which it is narrated I considered the subject in all of its phases. Many other similar cases have been reported by Continental authors.<sup>2</sup>

Another mode of infection of the breast with syphilis is from the secretion of hard chancres in the mouth of nursing infants. These cases are usually met with in private practice. The child is, as a rule, infected by some relative, friend, or chance acquaintance, who, having mucous patches in their mouths, implant the virus on the child's lip or lips. In due time the chancre appears (and it is commonly not large or much indurated), and by it the child's mother or nurse is infected at the breast.<sup>3</sup>

<sup>1</sup> "The Dangers of the Transmission of Syphilis between Nursing Children and Nurses in Infant Asylums and in Private Practice," *Am. Journal of Obstetrics and Diseases of Women and Children*, vol. viii., Nov., 1875.

<sup>2</sup> Audouy, "Étude sur la Syphilis communiquée par l'Allaitement," *Thèse de Paris*, 1869; and Appay, "Transmission de la Syphilis entre Nourrices et Nourrissons syphilitiques et notamment dans l'Allaitement avec Considérations médico-légales," *Thèse de Paris*, 1875; also Fournier, *op. cit.*, pp. 117 et seq.

<sup>3</sup> Such instances of syphilitic infection are not uncommon. I recall three cases within recent years, besides others seen years ago. In one case the infection was derived from the child's aunt, in the second from its nurse, and in the third the child was in all probability infected by a woman who was attracted to it in the streets by reason of its beauty, and who kissed and fondled it gushingly with the nurse's permission.

In this way syphilis is often introduced into a family, and all its members may become its victims. Further on in this section another mode of infection of the infant is described.

Chancres of the female breast are not infrequently seen which have been acquired in kissing from the infected mouths of lovers and husbands.

Then, again, men are sometimes infected on the nipple from the kissing and dalliance of women with infectious mouths. I have seen two such cases.

Chancres of the breast appear as chancrous erosions, as incrustated or ecthymatous chancres, and as indurated nodules and fissures.

In many cases but one chancre is present: this is particularly true when the nipple alone is involved. Out of fifty-six chancres of the breast seen by Fournier, in thirty cases there was but one chancre and in twenty-six there were several.

When seated on the areola there may be but one chancre, sometimes several, and occasionally many. I have seen sixteen in this situation, and Fournier speaks of a case on which there were sixteen chancres on the right and seven on the left mammary areola.

One or both breasts may be infected. According to the statistics of Audouynaud,<sup>1</sup> out of 51 cases both breasts were infected in 24, but one was infected in 24, and in them the details are wanting. This would show that the occurrence of chancres on one breast was as frequent as the occurrence of these lesions on both.

According to Fournier—and I am in accord with him—chancres are found most frequently at the base of the nipple, in the groove between it and the areola. Next in order is the nipple itself, and after that the areola. The integument beyond the areola is not very frequently involved.

Chancres of the breast are usually not seen until they are fully developed or are on the road to absorption or cicatrization. I have seen a sufficient number in these early states to enable me to describe them minutely.

The erosive chancre of the nipple begins as a small, slightly red, somewhat elevated papule or patch, with a smooth, velvety, excoriated surface, from which a little serum exudes. In this form the lesion increases in area and depth, the surface remaining smooth and shining, while the peripheral increase and depth may give it a nodular structure. The induration may be moderate, but is sometimes well marked. I have seen it here of the parchment variety. The chancrous erosion, or later the chancrous nodule, may involve more or less of the nipple, sometimes its whole structure.

When women nurse children, owing to the moisture of the parts the chancre usually remains in an erosive condition, but when the parts are dry, as in non-nursing women, the secretion is apt to form crusts, and then there is, as a result, an incrustated lesion.

In some cases ulceration takes place in the chancres of the nipple, and more or less tissue is lost and the symmetry of the organ destroyed. When ulceration attacks chancres of the nipple, the part may be the seat of pain. I have seen several cases in which pain lasted for years after the cicatrization of the chancre.

<sup>1</sup> *Loc. cit.*

The ecthymatous chancre of the nipple, sometimes unique and again multiple, appears like an indolent incrustated patch or papule, involving all or a portion of the appendage. The crust is of a yellow color, or it may be deeper, of a greenish-brown tint. It can usually be readily removed, and then the smooth, varnished-like surface of the chancreous erosion is exposed.

The indurated fissure of the nipple is an indolent lesion of considerable density, of pinkish or grayish-red tint, and its surface resembles that of the chancreous erosion. It is usually painless, though perhaps a little sensitive, and in this particular differs widely from simple cracked nipples. There may be one fissure or there may be several of them. The lesion is really an induration traversed by one or more fissures. This form of chancre may also become more or less incrustated.

Chancres of the areola are of the incrustated or erosive variety. In some cases the lesion is limited to the furrow at the base of the nipple, which it enlarges to a greater or less extent, being of the form of a segment of a circle. This may be incrustated or eroded.

Upon the areola we frequently find many small round or oval chancres, which may be incrustated or of the erosive type. These chancres are usually but moderately indurated, and, as before stated, as many as twelve to sixteen may be seated on the areola of one breast. It is very probable that the starting-point of these areolar chancres is the sebaceous glands, which are here so numerous.

Chancres of the integument of the breast beyond the areola are very rare. When seen they will be found to be of the erosive or incrustated types, presenting the usual appearances of chancre of the skin. They are more or less indurated, and sometimes form a distinct hard nodule.

In all cases of chancre of the breast there is concomitant indolent enlargement of the ganglia. In some cases those at the edge of the great pectoral muscle are affected, in others those of the axilla, and in many cases both classes are much swollen.

It is well to bear in mind the possibility of wet-nurses being the bearers of chancre of the breast, and physicians cannot be too careful in their examination of these women. A woman having a sore in the least degree suspicious should never be allowed to nurse a healthy infant. Careful inquiry should be made as to the condition and history of children nursed within at least the last month. Indeed, if it is possible, such children should be very carefully examined. A woman who has nursed a child with sore mouth or snuffles, eruptions, marasmus, or osseous lesions should be suspended for from four to six weeks, during which time, if she has been infected with syphilis, the initial lesions will appear on her breast. If these precautions and restrictions are not observed, the nurse during her first period of incubation, while her breast is yet seemingly healthy, may take charge of another nursling. While nursing the child her chancre appears, and in all probability her little charge will become infected.

In some cases, further complications, as long ago pointed out by Dron,<sup>1</sup> may grow out of these circumstances. The nurse, knowing nothing of

<sup>1</sup> "Mode particulier de Transmission de la Syphilis au Nourrisson par la Nourrice dans l'Allaitment," *Annales de Derm. et de Syphiligraphie*, vol. ii., 1869 and 1870, pp. 161 et seq.



the mode of development of syphilis, and finding her nipple sore, and later on her body covered with an eruption, naturally may settle upon the second and healthy child as the cause of her infection. She may then demand damages in money or go to law. Therefore it is very important in these cases that the physician should be thoroughly acquainted with all the phases and circumstances incident to infection of the nurse by the infant and of the infant by the nurse.

## CHAPTER LVI.

### HYPERPLASIA OF THE GANGLIA AND PERIVASCULAR SPACES.— ADENITIS AND LYMPHANGITIS.

IN every case of hard chancre the neighboring ganglia become indolently enlarged, and in many instances the lymphatic vessels are involved in a similar change. The enlargement is sometimes appreciable as early as the fifth day after the appearance of the sore, and, as a rule, between the seventh and the tenth days. In rather exceptional cases well-marked induration may not be felt until the fourteenth day, rarely later. At first, it is usually more pronounced on the same side as the chancre. Later on, both sides are involved, though the enlargement is sometimes unilateral. The hardness of the ganglia is peculiar in its density and painlessness. They are freely movable, and feel under the skin like almonds or little round tumors, which do not usually adhere to one another or to the overlying integument. Sometimes one ganglion becomes much larger than the rest, and exceptionally a number become blended into an indolent mass. In somewhat rare cases one ganglion in a chain seems to be spared; thus in chancres of the finger the epitrochlear may not be appreciably enlarged, while the axillary ganglia may be much swollen.

In the following table, prepared by Fournier, the seat of chancre and the situation of the indurated ganglia in anatomical relation with them are given:

#### *Seat of the Chancre.*

Chancres of the genital organs—*i. e.* of the penis, the scrotum, the labia majora and minora, the fourchette, the meatus urinarius, the urethra, the entrance of the vagina, etc.

Perigenital chancres (those of the perineum, the genito-crural folds, the mons Veneris, the thighs, the buttocks, etc.).

Chancre of the anus and the margin of the anus.

Chancres of the lips and of the chin.

Chancres of the tongue.

Chancres of the eyelids.

#### *Corresponding Indolent Adenitis in the—*

Inguinal ganglia.

Inguinal ganglia.

Inguinal ganglia.

The submaxillary ganglia.

The subhyoidian ganglia.

The pre-auricular ganglia.

Chancres of the fingers.

The epitrochlear and the axillary ganglia.

Chancres of the arm.

The axillary ganglion.

Chancres of the breast.

The axillary ganglia, and sometimes the subpectoral ganglia.

Chancres of the uterine neck.

Theoretically, the pelvic ganglia. Generally nothing is found in the groins; exceptionally an inguinal bubo.

**Seat.**—As already stated, the ganglia affected are those in direct anatomical connection with the initial lesion or chancre. Since a chancre is most frequently situated upon the genital organs, induration of the ganglia is commonly found in the groins. Chancres of the interior of the urethra in both sexes, of the perineum, of the anus, of the cervix uteri, of the buttocks, of the lower portion of the abdomen, and of any point of the lower extremities will likewise manifest their presence by induration of the inguinal ganglia.

With chancres upon the fingers the situation of the indurated ganglia varies. More frequently in these cases the ganglion on the internal side of the elbow or those in the axilla are involved. Again, ganglia between the points mentioned—the hand and elbow or the elbow and axilla—may become indurated. Chancres of the breast also affect the axillary ganglia.

Chancres upon the lips, both upper and lower, upon the tongue, and upon the chin cause induration of the submaxillary ganglia; those upon the eyelids, induration of a ganglion situated directly in front of the ear. Fournier mentions a case of a chancre occupying the palatine arch, in which a large ganglion was present in the thickness of the cheek; also another case in which infection was “very certainly” the result of catheterization of the Eustachian tube, and in which there were two voluminous ganglia in the parotid region, one directly below the ear and the other somewhat beneath it under the ramus of the jaw.

Thus the situation of ganglionic induration points to the approximate seat of a chancre, even after the latter has disappeared, and may be of essential service in unravelling the history of obscure venereal cases.

It will generally be found that those ganglia in immediate anatomical relation with the seat of the chancre are usually the ones which are most swollen. Induration of the inguinal ganglia may affect one or both sides. In the former case it is usually the side upon which the chancre itself is situated, although occasionally this rule is reversed, as with buboes attendant upon a chancreoid.

Wherever, as in the groin, a number of ganglia form a group, most of them, at least, are usually involved, but to an unequal extent. A “pleiad,” as it has been called, or a rosary-like arrangement, of small olive-shaped or globular tumors, is felt, cartilaginous in hardness, freely movable upon each other and the surrounding tissues, and without attachment to the overlying integument. One is commonly developed more than the rest, and attains about the size of an almond; the others, as large as a bean or cherry, surround it like satellites.

There are no symptoms of acute inflammation. The change has taken place insidiously and often without the patient knowing it. The skin is not altered either in color or temperature. Firm pressure sometimes reveals slight tenderness, but rarely excites severe pain, and

motion is usually not impeded. Indolence is one of the chief characteristics of the wrongly-called syphilitic bubo.

Less frequently, only a single tumor is felt in the groin, varying in size and shape in different cases: sometimes it may be compared to a good-sized plum, while at other times it is elongated, about the thickness of the finger, and corresponds in direction to the inguinal fold. In some instances as the tumor subsides it resolves itself into several, showing that it was composed of a number of coherent ganglia held together by a mildly proliferative periadenitis.

When a chancre is situated at a distance from any group of ganglia, as upon the fingers or face, only one or two of these bodies are usually involved.

Induration of the ganglia usually reaches its full development in the course of a week or fortnight. If mercury be given for the primary sore, it may somewhat diminish for a time, but commonly undergoes a recrudescence upon the evolution of secondary symptoms. It is usually more persistent than the latter, but its ultimate duration varies in different cases from several weeks to five or six months or even longer.

Resolution without suppuration is almost the constant termination of syphilitic induration of the ganglia. When, however, the chancre has been attacked by pyogenic microbes—and this is more common when phimosis has been produced—a suppurative adenitis sometimes results, which may be chronic or it may be very acute and present the same features as chancroidal bubo. It is not uncommon in suppurating syphilitic adenitis in the groin to find a diffuse bed of suppuration in which are scattered many hyperplastic and much-swollen ganglia. It was formerly claimed, when syphilitically engorged ganglia suppurated and broke down, that it was an evidence of a strumous tendency. A depraved condition of the system may render the course of such a suppurating bubo more active and severe, but it is not the genetic cause of the suppuration, which resides in the poisons secreted by the pyogenic process.

**Diagnosis.**—In general, the diagnosis of syphilitic adenitis is very easy when this condition is studied in connection with the chancre. It is sometimes observed that a man has a sore of doubtful appearance and with indistinct history, and in connection therewith there is indolent enlargement of the inguinal ganglia, perhaps bilateral, which the patient claims has been present for years. In such instances a prompt diagnosis cannot be made, but in the course of a week or two the nature of the affection can be determined.

In some very fat subjects it is often very difficult to clearly make out the condition of the inguinal ganglia. This same experience may also be observed in some rare cases in which the fascia and connective tissues are so compact and unyielding that thorough palpation cannot be practised.

In forming estimates of the condition of the inguinal ganglia it is always well to remember that other morbid conditions besides syphilis may cause them to become indolently swollen. Thus, after the subsidence of gonorrhœal adenitis the ganglia may remain hard, firm, and more or less enlarged. Eczema, psoriasis, phtheriasis, and all inflammatory diseases of the skin, when they attack the legs lead to painless or painful enlargement of the inguinal ganglia. Cuts, abrasions, traumatisms,



lesions of the nails, the heels, and in some cases the small or large inflammatory nodules which result from the bites of insects, may give rise to ganglionic swelling. All the foregoing conditions should be borne in mind when examining a case of supposed chancre and in exploring the inguinal region. I have known many an instance in which a benign lesion of the penis was unqualifiedly pronounced to be syphilitic in consequence of the presence of swollen lymphatic ganglia, which had become subacutely and chronically inflamed in consequence of the operation of one or more of the causes just detailed.

### Induration of the Lymphatics.

Though for brevity, and largely on account of its general acceptance, I use the above term, it is well to remember that in syphilis the chancre is first formed, and from this focus the infection promptly travels up the perivascular lymph-spaces which surround the vessels. Therefore, to be strictly and scientifically accurate, this condition is a syphilitic hyperplasia of the perivascular lymph-spaces, a periphlebitis, and a periarteritis.

As both the simple and virulent bubo have their occasional concomitants in simple and virulent lymphangitis, so has glandular induration its accompanying induration of the lymphatics.

Specific enlargement of the lymphatics is characterized by three important symptoms—viz. induration, absence of inflammation, and persistency.

The indurated vessel feels like a hard cord running from the neighborhood of the chancre toward the pubes along the upper surface of the penis in the course of the dorsal vein and artery, or, in a few instances, it occupies the side of this organ. It is generally single, but sometimes multiple; of the size of a crow- or goosequill; in some cases of uniform diameter, when it communicates to the fingers a sensation like that of the vas deferens, while in others it is swollen at regular intervals like a necklace, or is, as botanists would say, moniliform. The distal extremity arises in the induration surrounding the chancre, and the cord can generally be traced for two or three inches toward the pubes, sometimes to the base of this prominence, but rarely as far as the indurated ganglia in the groin.

I have had under my care recently a case in which the lymphatic cord began at the coronal sulcus, ran up the penis, and near the root became as large as one's finger, and thus remained after turning at right angles at the pubis, and ended in a mass of engorged ganglia of the groin.

Induration of the lymphatics is most frequently observed upon the penis, but is not limited to this region. Bassereau relates a case of chancre upon the cheek in which a hard cord could be traced from the indurated base of the sore to an indurated ganglion beneath the angle of the jaw.

Induration of the lymphatics appears about the same time and in the same manner as that of the base of the chancre, and the two generally correspond in degree of development. The former is less constant than the latter, but if sought for may be found in a large proportion of cases.

Induration of the lymphatics usually undergoes resolution about the

same time as that of the chancre, but in a few rare instances it becomes inflamed and terminates in suppuration, when fistulous openings may form along the course of the vessel. In these cases there is usually a complicating infection of the chancre by pus-microbes, and an active suppurating process results which spreads to the lymph-spaces.

It is always well to cause patients to rub mercurial ointment into hyperplastic syphilitic ganglia as soon as general manifestations show themselves. Such a course materially aids in curing the syphilis. In case the lymphatics are swollen, lint smeared with mercurial ointment should be wrapped around the penis and kept there night and day if practicable.

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## CHAPTER LVII.

### GENERAL OUTLINE OF THE SYMPTOMS AT THE EVOLUTION OF THE SECONDARY STAGE.

AT the expiration of the secondary period of incubation, which may be as short as forty-five days, and exceptionally as long as seventy, eighty, or ninety (rarely longer) days, the secondary period of syphilis begins. This stage of the disease is also called the period of general or constitutional manifestations, and also the condylomatous stage. The teachings of pathological anatomy show very clearly that in the secondary period of incubation the infection of the whole system is going on slowly, insidiously, but effectively, until in the end the acme is reached, when general systemic manifestations and symptoms are developed.

There is a remarkable variation in the amount of systemic disturbance at the beginning of the secondary period. In many subjects no deviation whatever from the healthy standard is observed to mark the commencement of the secondary stage, and the dermal lesions are the only evidences of syphilis. These very often pass away unobserved, and as a result a hiatus in the patient's medical history is produced. In other cases, however, particularly in women, much and varied constitutional disturbance takes place. In some cases syphilis comes on abruptly, and, we may say, it explodes.

Perhaps the most constant morbid symptom is fever, which, though absent in many cases, is present in most in varying degrees of intensity. In some cases there is an elevation of temperature of from one to three degrees, commonly with a corresponding mild nocturnal exacerbation. In other cases the febrile movement is well marked, the morning temperature being from 101° to 102° Fahr., and in the evening 104° Fahr., and in rather exceptional instances higher, even to 107° Fahr., particularly in women. Besides the elevation of temperature there is a corresponding acceleration of the pulse, and the respiration ratio is increased. The tissue-metamorphoses are present in the urine in proportion to the intensity of the fever.

Various neuralgic pains are also complained of by patients, the peculiarity of which is their quite constant occurrence toward dark and at night. Nocturnal headache is frequently experienced, which varies in severity from a mild and endurable form to one in which the patient's sufferings are agonizing, in which he or she is tortured by pain during the night, and is prostrate, worn out, and suffering during the day, when it may not wholly cease. Such patients say that their heads feel as if they were being crushed as by a vise, or as if a nail were driven into their skulls. Sometimes the pain seems to be superficial, and may affect the temporal, frontal, or occipital regions. In many cases these pains are so excruciating that the sufferer is an object of pity. These pains in the head may occur at the date of onset of general manifestations and at later periods.

Intense neuralgic pains, affecting the cranial nerves, the fifth in particular, also seated in the intercostal nerves, in the sciatic and its branches, and in the anterior crural, are not uncommon. Persons, who have previously suffered from neuralgia of any part are especially liable to exacerbations during the eruptive stage of syphilis, and, in fact, at any time during the activity of the diathesis.

Insomnia is a symptom sometimes complained of by syphilitic patients, who can give no reason for it whatever, since in many cases there is no physical suffering. It is peculiar in the fact that it is not readily influenced by soporifics, but gradually ceases with the disappearance of the exanthematic symptoms under mercurial treatment.

In some exceptional cases, particularly in women, a mild and temporary aberration of the mind is observed in the form of hysteria, emotional disturbances, hallucinations, delusions, and morbid impulses. In men there may be present mild or severe stupor, delirium, and even mania. Pains in the muscles and joints simulating rheumatism and occurring at night are most constant at the evolution of, and during, the secondary period. These are sometimes so severe that they produce disability of the member affected.

Disturbances of the sympathetic nervous system are sometimes strongly marked, particularly in anæmic and thin persons and in women. Such patients complain of cold feet, and their hands feel like marble or ice, and they are chilled by the slightest draft.

The tendency to anæmia in early secondary syphilis in many cases is well marked. The diminished nutritive qualities of the blood, which loses in red corpuscles and contains a marked increase in leucocytes, and the impairment of the nutrition of the tissues are shown in the pale, shallow, and emaciated facies, in the palpitations and the small thready pulse and shortness of breath, in the want of appetite and energy, and in the nervousness, restlessness, apprehensiveness, and great languor amounting often to dejection.

While in most cases this formidable combination of symptoms is gradually dispelled by treatment, and a healthy tone, mental and physical, is restored, in many, particularly in persons of poor fibre, in those suffering from visceral diseases and from adynamic conditions and other morbid states of the system, this cachexia and asthenia may persist, and require the most intelligent management, therapeutical, hygienic, and climatic, to successfully combat it.



Relapses of anæmia, cachexia, and asthenia are common during the whole course of the infection.

The **course** of syphilis is remarkably uncertain, the disease being seen in all degrees of mildness and in every form of severity. Constitutional peculiarities, habits, and surroundings are at the bottom of this morbid action. Some patients suffer very mildly from syphilis, even when they do not follow treatment, while others, again, are sorely punished. In the majority of cases patients otherwise healthy experience very little trouble from syphilis, provided they pursue a proper treatment for a sufficient length of time, avoid alcoholics, husband their strength, and exercise watchfulness of their general well-being. It is said that patients of light complexion and reddish hair suffer more severely than those of dark complexion—a statement which is in the main correct. But although the epithelial tissues and the integument of these patients are so frequently—and we may perhaps say persistently—attacked, the prognosis is good if their bodies are otherwise sound and healthy.

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## CHAPTER LVIII.

### THE VARIOUS MORBID CONDITIONS AND AFFECTIONS OF THE SECONDARY STAGE.

It is necessary for completeness of description to trace the course of the infection in the various tissues and organs, and to study in greater detail the symptomatology of the second stage of syphilis.

Since the perivascular lymph-spaces and lymphatic ganglia are so constantly and extensively involved in syphilitic infection, it is important that their condition should be clearly studied.

#### **Generalized Hyperplasia of the Superficial and Deep Lymphatic Ganglia.**

With the generalization of the syphilitic infection the superficial and deep lymphatic ganglia of the whole body become indolently and painlessly swollen. Though this condition is spoken of as essentially belonging to the secondary period, there is no doubt that the tissue-changes which take place in the ganglia begin quite early in the secondary period of incubation, and they become mature at the time of onset of other secondary lesions. The ganglia which are most accessible, and therefore important in a diagnostic point of view, are the anterior and posterior cervical ganglia, situated anteriorly and posteriorly to the sternocleido-mastoid muscle, the occipital ganglia, those over the clavicle (on either end) and on the margin of the pectoral muscles, the anterior and posterior auricular or the mastoid ganglia, the epitrochlear at the elbow-joint above the internal condyle, and the axillary ganglia. All of these

ganglia become swollen in secondary syphilis as a result of the essential hyperplastic process produced by the virus. In some cases the ganglionic reaction is rendered more intense by the presence of irritated syphilitic lesions or by inflammatory skin lesions which may be developed on the regions of the body in which lymphatic radicles take their origin.

In this way the lymphatic ganglia of the neck, of the axillæ, and groin may become more or less acutely swollen, and may then be the seat of pain. Whenever any of these ganglia go on to suppuration, it is certain that a nearby pus-focus has supplied the irritating secretions or the microbes.

While hyperplasia of the superficial ganglia occurs, as a rule, in early secondary syphilis, this condition also may be observed in exceptional cases in late syphilis, particularly in persons whose nutrition has been lowered and whose constitutions have by any means been impaired.

DEEP LYMPHATIC GANGLIA.—It is now generally conceded that the changes in these ganglia are among the most frequent and most constant of the effects of tertiary syphilis. They bear the same relation to syphilis of the viscera that adenopathy of the subcutaneous lymphatic glands does to syphilis of the skin; in other words, they are its constant accompaniment. The affection of the deep lymphatic glands may, however, exist without any lesion of the viscera, just as the post-cervical and epitrochlear glands may be enlarged without any eruption upon the scalp or arms.

The glands most frequently affected are the prevertebral, lumbar, iliac, and femoral; the mesenteric glands and those of the extremities are rarely involved. The changes are various. Most frequently there is hyperplasia of the glandular elements; the gland is increased in length rather than in breadth, is friable, of soft consistency, of a reddish- or yellowish-gray color, its surface injected, and its substance cheesy. In other cases the connective tissue of the gland appears to be the chief seat of the lesion, and this body becomes indurated. Suppuration is never present, which is an important diagnostic sign between this and the affections of the glands in typhoid fever and in tuberculosis.

Two forms of syphilitic adenitis are described by Cornil—the secondary, and the other of the tertiary stage of syphilis. In the former the microscope shows, besides the lymph-corpuscles, large spheroidal cells, more numerous in the cavernous than in the follicular structure of the gland. The cells contain several nuclei, the larger of which enclose nucleoli. There is also slight increase of the connective tissue, so that there exists cell-proliferation combined with a moderate degree of sclerosis. In tertiary adenitis the swollen ganglia form soft whitish masses of a medullary appearance. Round and granular lymph-corpuscles and large multinucleated cells crowd the cavernous tissue and the lymph-passages of the ganglia. This is therefore a kind of catarrhal inflammation. Two forms of tertiary adenitis have been recognized and made the subject of a thesis by Gonnet,<sup>1</sup> who calls them sclerous and gummatous adenitis. He says they may occur together, and the former may be converted into the latter.

<sup>1</sup> "L'adénopathie syph. tertiaire," *Thèse de Paris*, 1878.

**Syphilitic Fever.**

According to my observations, fever occurs in secondary syphilis in the majority of cases. It may be transitory or persistent; it may be so mild as to escape notice, or it may be moderately intense. It presents two forms: in one the febrile condition is continuous, in the other it shows distinct remissions.

Let us first consider the continuous fever which accompanies the evolution of syphilis, well named by the Germans the "eruption fever." It seldom occurs before the thirtieth day of the secondary period of incubation—that is, ten days prior to the evolution of secondary symptoms. In at least half the cases of syphilis there is no febrile reaction until within three or four days of the first evidence of constitutional infection. In rare cases the temperature may reach  $103^{\circ}$ , or even  $105^{\circ}$  F., within twenty-four or forty-eight hours. Frequently it does not exceed  $101^{\circ}$ , remaining at that point until the eruption appears, when it again rises, possibly to  $105^{\circ}$ . It then, as a rule, falls gradually or abruptly to about  $102^{\circ}$ . In almost all cases there is a difference of about one degree between the morning and evening temperatures. In other cases a temperature of  $105^{\circ}$  is observed ten or twelve days before the end of the secondary period of incubation, and continues without remission until the eruption appears, when it falls abruptly to  $102^{\circ}$ , where it may remain for several days. In the majority of our cases  $102^{\circ}$  has been about the average temperature.

Some observers consider the febrile reaction a reliable indication of constitutional infection, but in some cases the eruption precedes the fever by an interval of a week or ten days.

The remarkable effect of mercury upon the temperature has been noticed. Its use causes a reduction nearly or quite to the normal standard in some cases within ten days, whereas without it the febrile condition may persist for several months.

Early in the secondary period the fever is prone to relapse, possibly at the same time with a recurrence of general or special syphilitic symptoms. In these cases the temperature rarely goes above  $102^{\circ}$ .

When phagedena attacks the initial lesion and syphilitic cachexia appears early, the fever is likely to be excessive and prolonged. In weak and sickly persons the elevation is notably greater than in the robust, and in women it is higher than in men. The febrile reaction accompanying an erythematous syphilide is often as extreme as in a simple eruptive fever. In most cases of papular eruption the fever is moderate. In cases of pustular eruption and of iritis accompanying general secondary symptoms it is more marked. In general the febrile reactions of the early years of syphilis are more intense than those occurring later. Indeed, lesions of much gravity may occur after the lapse of years, unaccompanied by fever. On the other hand, it may coexist with the various nervous and visceral affections of the tertiary stage.

Syphilitic fever not infrequently presents a distinctly remittent type—a peculiarity which may be noticed in the early period, but is generally not observed until late in the course of syphilis. I have seen but two cases in which the fever began in a remittent form ten



days before the general outbreak, and retained its character for nearly three weeks. When remittent fever occurs early it usually accompanies the development of constitutional symptoms. It is never very protracted. The exacerbations occur, as a rule, daily and toward night, beginning, perhaps, between six and eight o'clock with a general cold sensation, soon followed by fever. The chilly feeling may be insignificant or it may be quite marked, and may last for an hour or more, being accompanied by a feeling of lassitude and soreness, and perhaps by headache more or less severe. Thirst seems to be less than in other forms of fever. The sweating stage is incomplete, there frequently being only slight moisture of the surface. It thus differs from malarial fever in this respect, as well as in the fact that the stages are neither of them clearly defined, that of heat being most marked. The elevation of temperature varies from 102° to 105° F. The pulse-rate is not proportionately increased. Relapses are quite common, even after long intervals. The gravity of the fever is greatest in cachectic subjects, in whom it may assume a typhoid type.

This form of fever occurs most frequently in the secondary period during the first two years of infection, yet it may appear in the tertiary period, possibly coexisting with lesions peculiar to that stage.

The **prognosis** depends wholly on that of the associated syphilitic diathesis.

Quinine has been found ineffective, but the remittent as well as the continuous form is strikingly amenable to mercury. The curious fact is reported by Jullien to have been observed by Domenico Copozzi, that in one instance the salts of quinia converted a quotidian syphilitic fever into a tertian, and then to a double tertian, when it relapsed to a quotidian, which finally yielded to mercury.

### **Cachexia, Chloro-anæmia, and Asthenia.**

At certain periods during its course syphilis produces an adynamic condition of the system called "syphilitic cachexia." These periods are at or just before the evolution of the disease during its secondary stage and toward the close of its tertiary stage.

In these cases there may be observed, soon after the onset of the secondary stage, loss of appetite and strength, emaciation, and a pale, sallow appearance. The pulse becomes rapid, weak, and small, and the temperature rises. The patient feels dejected, nervous, and apprehensive. The condition becomes graver in proportion to the extent of the numerous functional disorders which accompany the inauguration of the secondary stage. Headache, neuralgic or rheumatoid pains, with severe nocturnal exacerbations, may torment the unfortunate sufferer.

The cachexia of the secondary period of syphilis also may begin a few months after the onset of the disease. It is seen chiefly in weakly persons oftener than in the robust, and, again, more frequently in those who have had imperfect or no treatment whatever; hence we have reason to infer that early and adequate treatment will prevent its occurrence. The general symptoms of cachexia, already given, are repeated in this stage of syphilis in a milder form. Frequently nothing can be found to account for the condition, and the only suspicious feature of the

case is the occurrence of headache or pain, due to a low grade of inflammation in bony or fibrous tissue, and which are more severe at night.

In most instances there is no reason to anticipate an unfavorable result, but in others these vague symptoms are so alarming as to suggest serious visceral lesions. I have sometimes found slight enlargement and tenderness of the liver, and often marked splenic hypertrophy. The urine in uncomplicated cases is usually of very low specific gravity and deficient in mineral ingredients.

In spite of the serious nature of the case, gradual restoration to health may be expected under appropriate treatment.

Fournier thinks that the female is usually more seriously affected than the male sex. He has observed that syphilis produces in the former two conditions—one “chloro-anæmia,” and another, more severe, “asthenia.

The chloro-anæmic woman has a pale, leaden color slightly tinged with yellow, is emaciated, weak, and subject to palpitations on slight exertion. Frequently an anæmic bruit may be heard in the large vessels. The patient complains of *muscæ volitantes*, of vertigo, and of excessive nervousness. The appetite may be impaired or it may be ravenous, large quantities of food being taken and not assimilated. Fournier terms this “*boulimie*,” or a temporary exaggeration of the appetite. While admitting its occurrence in those who present many nervous symptoms, he insists on its specific origin. It is probable that “*boulimie*” and the unnatural thirst termed “*polydipsia*,” which are often associated together, are hysterical symptoms resulting from the depressing influence of syphilis.

The condition of asthenia is regarded by Fournier as totally distinct from chloro-anæmia, since those women who are the subjects of it show no evidence of anæmia in the countenance. They complain of great weakness and prostration, and are low-spirited and indisposed to any kind of exertion, and even gentle exercise induces fainting. Fournier says that the debility is greater than is observed in cases of profuse hemorrhage or in convalescence from adynamic fevers. The pulse is weak, respiration is slow, digestion is deranged, and nutrition is imperfect. Nervous depression is indicated by dulness of hearing and sight, and by inability to sustain prolonged mental effort.

This condition is often combined with chloro-anæmia, and, like the latter, varies greatly in severity and is amenable to proper treatment.

The danger in each of these conditions is from the diminished resistance of the system, which lends a malignant feature to any intercurrent affection that may attack the patient.

### The Typhoidal Condition.

In the early months of syphilis certain grave adynamic conditions sometimes supervene, which may very properly be termed the syphilitic typhoidal state, or, as Fournier calls it, *typhose syphilitique*. This condition, which is not common, is usually seen in weakly and overworked or under-fed individuals, in males more frequently than in females. Malaria and a neuropathic tendency are sometimes contributory causes. It may occur quite early in the infection coincidently with the develop-

ment of the general manifestations, and at any time during the first year. It may supervene in some subjects in whom the treatment has been inefficient or wanting, and also as a result of excesses, sexual and alcoholic, and of severe bodily and mental strain.

The patient may or may not complain of headache at first, but he experiences a feeling of great weakness which soon develops into utter prostration. He has a mild continuous fever and dull frontal headache, and his pulse is rapid and small. He becomes pale and sallow, has no energy, and desires to lie down. All his senses grow to be impaired and dull, and he becomes somnolent and torpid. He has confusion of thought, vertigo, and sometimes photophobia. His appetite leaves him, and his bowels are usually slow; exceptionally there is diarrhoea. In this condition he will lie in bed indifferent to all around him, not caring for food, and sometimes having great distaste for it. In this lethargic condition he may become mildly or severely delirious, and in some bad cases maniacal. It will be observed, however, as a rule, that the peculiar dull, earthy tint of the face so constantly seen in typhoid patients is not well marked in syphilitic subjects. But there is the same typhoid facies, as shown in the utter loss of tone of the facial muscles.

Though the condition is a very rare one, it does not commonly lead to death, and it may be relieved by antisymphilitic treatment, together with good care and nursing and nutritious food. The convalescence, however, is rather slow, and several months may elapse before the patient begins to gain in weight and acquires his normal physical strength and mental balance. In this condition, however, hemiplegia, aphasia, and epilepsy may supervene, and then the gravity of the case is much enhanced.

The **diagnosis** of this condition is usually easy if the medical history of the patient is known. The absence of diarrhoea, of abdominal tenderness, and of gurgling in the right iliac fossa, and of the typically pronounced typhoid facies, will, when carefully studied, lead the physician to a correct interpretation of the nature of the case.

### Hysteria.

In men, and particularly in women, a condition of more or less pronounced hysteria may be developed in the early months of syphilis. This condition can be comprehensively portrayed by the recital of a case of a syphilitic woman which brings out its salient features: After the onset and cessation of roseolar and papular eruptions, pains, and iritis, a woman twenty-two years old began to suffer from continuous supraorbital pain and quite permanent dizziness. In walking her steps became unsteady, and on occasions a sensation as if she would inevitably fall backward was felt, but was always controlled by a forced mental effort. She was emaciated, and, instead of being cheerful, as she was naturally, she was sad and despondent. Her appetite was poor, but not capricious; the bowels moved regularly, and urine was normal in quantity and as to constituents, and her menses were regular. Her pulse was 60 and small, and the temperature normal. It was noticed that she was more irascible than usual, and after such spells, which were of frequent occurrence, she often wept copiously. After this she would remain for hours in a condition of abstraction, not appearing sensible or cognizant of things passing around her. She would



go away from the table when eating, imagining that she was not good enough to be in company with others. At other times she would become very suspicious, and would imagine that her friends were conspiring against her or that they were laughing at her and making sport of her. Under this impression she would become very nervous, and would shrink away and cry, and would perhaps sit hours without moving; and if any one came near her she would, as it were, awaken from her lethargy greatly frightened and be much agitated. When spoken to she recognized those around her very readily, and was pleased to see them, and she said she felt a queer sensation in the head. When asked if she felt in this strange manner continuously, she replied that there were intervals in which she was comparatively free from the sensations, and that she tried very hard to resist them. She said she felt quite weak, that her memory was very poor in comparison to what it had been, and that in reading a book or paper she very often forgot when she got through what she had read. This fact was very apparent, for she was fond of reading the sensational serials in the weekly papers, but her memory was so much impaired that she could not keep the thread of the narrative. She complained of weakness and dimness of vision, and she frequently saw *muscæ volitantes* before her eyes. She said, also, that her sleep was very much disturbed, and she frequently awoke greatly alarmed. Upon walking a sensation of ataxia was noticed, and she said she felt uncertain as to where she was placing her feet. At this time she had nocturnal rheumatoid pains along the tibiæ, and also in the larger joints. There was also a loss of sensation to pain or analgesia of the backs of the hands. In this case it will be seen that there were troubles of intellectuation and of the special senses.

Fournier<sup>1</sup> recently reported the case of a man who in the secondary stage of syphilis complained of voraciousness of appetite, who had a diminished field of vision of the left eye and a complete sensitivo-sensorial hemianæsthesia of the same side. This condition developed in eight days.

As a rule, these cases respond quite promptly to general and special treatment, and a good prognosis may be given.

### Analgesia.

Syphilis very commonly gives rise to various disorders of the general sensibility, especially in women. The most frequent of these is a loss of the perception of pain, or analgesia, with which is sometimes combined the absence of the sense of touch and of temperature. In such cases, for instance, a pin may be thrust deeply into the flesh without the patient's suffering any pain, or she may be also insensible to the touch of the fingers, or cannot distinguish between hot and cold substances.

Syphilitic analgesia varies in degree in different cases, and also in the extent of the surface affected. In some instances it extends from head to foot, in others it is confined to particular regions, when the extremities of the limbs, as the hands, the lower half of the forearms, the feet and ankles, the female breasts, are almost invariably involved. The back of the hand, over the dorsal surface of the metacarpus, is a

<sup>1</sup> "Hystérie secondaire syphilitique," *Annales de Derm. et de Syph.*, 1895, p. 23.

favorite site, where it is likely to be found if anywhere. The disorder occurs during the early secondary period, and most commonly lasts for several months.

Cases of this affection have frequently come under my observation both in the male and the female sex. It would probably be found oftener if looked for, but its presence is of no special value either in the way of prognosis or treatment, and is hence for the most part neglected.

### Disturbance in the Reflexes.

In some cases of syphilis, prior to the onset of general manifestations and during their evolution, an exaggeration of the reflexes of the skin and tendons may be observed. This condition may develop slowly or it may appear quite suddenly. Finger<sup>1</sup> has studied this subject carefully, and has convinced himself that the increased excitability gradually ceases, and ends in a corresponding decrease in which the reflex situation is considerably below normal. Relapses of the secondary eruptions are, according to Finger, followed by a decrease in the normal excitability of these tissues and parts. Zabourine<sup>2</sup> confirmed Finger's conclusions, having used in his observations the instrument of Alélekoff and Daniels designed for the purpose. This observer claims that this symptom occurs in all cases, and that it is due to vascular and hyperæmic conditions of the cord.

According to Marx,<sup>3</sup> the patellar reflex excitability is greater in syphilitic women than in men, and is particularly acute during menstruation. Fatigue and alcoholism tend to diminish the excitability in a notable degree.

### Synovitis.

Two forms of synovitis occur during the course of syphilis—the one simply a chronic effusion into the joint without any appreciable change therein; the other an affection in which there is, besides the effusion, a thickening of the synovial membrane.

*Synovitis of the Early Stage.*—This begins slowly and painlessly. The patient experiences slight stiffness in the joint, which is found to be swollen. On examination the usual symptoms of effusion are found, which vary according to the joint attacked. The skin covering the joint is not changed. Firm pressure may cause slight pain, and dull pain may often be felt at night, but the articular surfaces may be crowded together with impunity. The amount of effused fluid varies; in some cases it is very slight, in others copious. A peculiar feature of this affection is the intermittent character of the effusion. For example, a patient may have complained of a moderate effusion, which seemed to wholly pass away; after a longer or shorter period it returns and reaches a certain stage, where it remains for a time; then the swelling increases; after, it decreases very perceptibly, and again increases to marked proportions. During this

<sup>1</sup> "Ueber eine constante nervöse Störung bei florider syphilis der secundärperiode," *Vierteljahr. für Derm. und Syph.*, vol. xiii. pp. 255 et seq.

<sup>2</sup> "Le reflexe tendineux du Genou dans l'Eruption primitive de la Syphilis," *Annales de Derm. et de Syph.*, 1893, pp. 840 et seq.

<sup>3</sup> "Untersuchungen über Patellar-reflex insbesondere bei Lues," *Dermat. Zeitschrift*, 1894, pp. 397 et seq.

whole period the patient has suffered little inconvenience, except a slightly painful stiffness of the joint in the morning, which passes away in an hour or two, and perhaps a slight pain at night. Not infrequently such patients also suffer from periosteal pain in the course of the long bones or from nocturnal neuralgia. The effusion may remain for a long or short period. In some, particularly those who are subjected to treatment, it passes slowly away, and the joint is apparently left in its normal condition. In other cases the affection is chronic and persistent, and the effusion disappears very slowly. In these cases we usually find the whole joint somewhat enlarged and indurated, and subject to frequent small effusions. There is no tendency to suppuration or destruction of the joint.

The **diagnosis** of this affection can be generally made out without difficulty. The history of the case and the slow, painless, intermittent, and subacute character of the effusion establish its distinct nature from the synovitis of rheumatism or of gonorrhœa.

### **Precocious Osseous Affections.**

The bones may be attacked in the early months of syphilis, although osseous lesions generally develop quite late. The bones most liable to early affection are those of the cranium, the ribs, the sternum, the clavicle, and the tibia. According to Mauriac, these lesions may occur even before the cutaneous manifestations of syphilis. I have observed localized pain in the bones at the period of invasion, but never distinct swellings much before the third month of syphilis. The swellings appear quickly and with fixed pain, which is worse at night, and may be accompanied by radiating neuralgic pains.

Of the skull-bones, the frontal and parietal are most commonly attacked. The swellings vary in diameter from half an inch to an inch and a half, and reach a height of half an inch. They are round and smooth, and if slowly developed are quite hard. They may be single or multiple, unilateral or symmetrical. I have now under observation a patient affected six months ago upon whose skull there are thirteen of these nodes. They may occur at the angle of junction of the frontal bone with the orbital plates or on the occipital bone, but they are usually on the sides of the skull. Mauriac states that they are sometimes confluent. In some cases cerebral symptoms indicate that similar lesions exist on the internal surface of the cranium.

The clavicle is usually affected at its sternal extremity, the articulation sometimes being involved. The upper third of the sternum is more commonly involved than the lower third. Occasionally its borders are attacked with portions of the costal cartilages, when the patient may complain of severe dyspnœa and pain on deep inspiration. In such a case a localized pleurisy has probably been excited. In severe cases the ribs themselves may be invaded, especially their anterior portions. Its subcutaneous surface is the portion of the tibia most frequently the seat of these tumors. They vary in size and number, but are usually not as salient as similar swellings of other bones. The radius and the ulna are also sometimes attacked. The swellings are usually near the joint, the wrist more commonly than the elbow.



These tumors often attain a large size in one or two weeks. The pain, which is always present, is aggravated by pressure and is worse at night.

The lesion is undoubtedly due to hyperæmia of the periosteum and the formation of new fibrous tissue. Gummy infiltration probably does not occur. The tumors have a tendency to spontaneous involution, and very rarely break down and form ulcers. If left to themselves, they become converted into bony nodes, but they yield readily to proper treatment. In but one case, a tumor of the sternum, have we seen necrosis take place. The ulcer, which resembled a gummatous ulcer, had the eroded bone for its base and healed slowly, leaving a depressed cicatrix. Early treatment prevents deformity, but delay may result in superficial atrophy of the bone.

These lesions are generally accompanied by others of the secondary stage; they may occur even before the disappearance of the primary sore. A mild form of hydrarthrosis is sometimes induced by their proximity to a joint.

**Treatment** should be both local and internal. Mercurial ointment well rubbed in twice daily and kept constantly applied to the parts is the best. If it cause irritation, it may be mixed with an equal quantity of oxide-of-zinc ointment. Internally the mixed treatment is required.

### **Rheumatoid Pains and Rheumatism.**

Some of the most constant symptoms of the early months of syphilitic infection are pains in the muscles, fasciæ, bones, and joints. These are termed rheumatoid pains, articular pains, and arthralgia; they chiefly attack the larger joints, such as the shoulder, the knee, the hip, the ankle, elbow, and wrist, and often the phalanges. The muscles affected are chiefly those of the extremities, and the fasciæ of these parts and of the large joints are also attacked. Sometimes a single muscle, and again groups of muscles, may be attacked. The sensation may be that of simple weakness or fatigue, of moderate soreness, and even of a dull or severe aching pain. The pains begin generally toward evening, and they may become atrocious, and even intolerable, during the night. Toward morning they usually cease, and leave a sensation of soreness and stiffness in the joint. In some cases the irritative process is so severe that a joint is temporarily rendered nearly immobile. In some rare cases in the early secondary stage the rheumatoid pains are felt on the surface and in the continuity of the long bones.

### **Acute Articular Rheumatism.**

As a very exceptional feature in secondary syphilis a condition resembling acute articular rheumatism is developed, particularly within the early months of the infection. The joints chiefly attacked are the large ones, and also the small ones, which become swollen and very painful, and the skin over them coincidently becomes red and tender. As a rule, the process is quite protracted and extends over several weeks, and even as long as two or three months. Usually one or more joints are attacked at a time, and whenever the inflammation begins it shows a tendency to stay. It is not common in acute syphilitic rheumatism to see the inflammatory process cease in one joint and then jump to another,

as it so commonly does in the simple form. In the specific rheumatism heart-complications are very great exceptions.

The fever may be mild, and then again it is sometimes of quite pronounced type. In the milder forms the morning and night temperature may vary between 100° F. and 103° F., whereas in the severe order of cases it usually oscillates between 102° F. in the morning and 105° F. in the evening. There may be mild sweating, but we do not observe the drenching sour sweat of acute rheumatism. In the syphilitic form of acute rheumatism there also may be sometimes observed periosteal swellings on the shafts of some of the long bones, the tibia, fibula, and radius and ulna chiefly. In one instance I observed periostitis of the cranial bones.

Though this form of rheumatism is often quite rebellious, it usually yields in a few weeks to careful antisymphilitic treatment.

In almost all cases in which there is mild or severe syphilitic fever, whether the condition be typhoidal, hysterical, or rheumatismal, there are usually neuralgias of the cranial, intercostal, sciatic, or anterior crural nerves, which come on toward night and are usually severe at that period of the day.

### **Hyperæmia and Hyperplasia of the Pharynx and Tonsils.**

In many cases of syphilis, coincidentally with the evolution of the secondary manifestation, a diffuse redness and thickening of the pharynx and a swelling of the tonsils may be seen. Very often patients make no complaint, and are unaware of the existence of this local trouble. Then, again, the soreness, stiffness, and pain give rise to much suffering and inconvenience. In many of these cases there is no superficial lesion other than moderate excoriation; in some, however, mucous patches and condylomata may be present. This pharyngeal hyperæmia may be very persistent, particularly in smokers, and in some patients it is much increased by the use of mercury internally. Local treatment is very necessary for this condition, which should be constantly looked for.

### **Pleurisy.**

Recent observations have conclusively shown that the pleura may be attacked early and late in the secondary period of syphilis. The affection may or may not have distinctive characteristics. In some cases patients complain of pain in the chest-wall, which is usually limited to a space of the size of one or two palms of the hand. It is not at all uncommon in dispensaries, and even in private practice, for patients to come who are covered with an erythematous or papular rash, and to see on them one or more porous plasters placed on the chest-wall, usually about midway from the shoulders, and on either the anterior lateral or posterior surface. They may complain of soreness, stiffness, or even pain of a dull and, somewhat rarely, stabbing character. In these cases there may be no fever at all, or the temperature may be a little above the normal. There may be slight effusion; rarely is it copious. In some cases a mild friction-sound gives evidence of moderate fibrinous exudation.

Brousse<sup>1</sup> and Chantimesse and Widai<sup>2</sup> have observed cases in which there were successive attacks of pleurisy with or without chills, and perhaps attended with pain and fever. It begins quite early, and may be observed through the whole secondary stage.

Rochon<sup>3</sup> claims that in every case of pleurisy in early syphilis he found hypertrophy of the spleen. Brousse found the concomitant condition in only one case.

This early pleurisy is, as a rule, readily and promptly curable.

Prætorius<sup>4</sup> thinks that pleurisy is far from rare in syphilis—that it develops slowly and without the *points de cotés* and without expectoration. According to his observation, it attacks the apex and middle parts of the lungs in the secondary and tertiary stage. In the latter it is more insidious than in the early stage. It may or may not give rise to effusion.

On the other hand, in a more recent essay by Monserat,<sup>5</sup> who has observed several cases and has gone over the literature of the subject, he claims that in early syphilis, either concurrently or not with eruptions, pleurisy may develop with severe invasion with painful *points de côté*, intense dyspnoea, and perhaps with marked fever. There may also only be mild pleurodynia and febrile movement. There may be moderate effusion or the process may be dry. It may be unilateral or both sides of the chest may be attacked.

The **course** of syphilitic pleurisy, according to this observer, is irregular, and several successive attacks may occur.

Pleurisy is often coexistent with joint lesions, all of which are due to subacute irritative processes.

Nikulin<sup>6</sup> observed two cases of pleurisy, in one of which the inflammatory process invaded the serosa of the lung by extension from peritonitis of the ribs; in the other it was primitive in the pleura.

The first case was that of a man forty-five years old, and syphilitic twelve years. For three months he lost flesh, was much debilitated, and had fever which was influenced by antipyretics. He had pain in right side, a dry cough, and dyspnoea. There was prominence on this side of the size of an octavo sheet of paper, and dulness on percussion. The patient was promptly cured by the use of iodide of potassium.

In the second case the man was forty years old, and had been syphilitic nineteen years. He complained of pains in the thorax, a sense of oppression, fever, and sweats. He had lost much flesh and was very weak. An intense friction-sound was heard over the affected part. Blisters failed to give any relief, which promptly followed the administration of the iodide of potassium.

Thus it will be seen that there are two forms of pleurisy caused by syphilis, the early and the late form. The first is readily curable by mercury and iodide of potassium in combination, while the second form

<sup>1</sup> "Pleurisie syphilitique de la Periode secondaire," *Annales de Derm. et de Syph.*, 1894, pp. 965 et seq.

<sup>2</sup> "Pleurisie du Stade roséolique de la Syphilis," *Bull. de la Société méd. de Hôpitaux*, Aug. 18, 1890, and *Bulletin médical*, 1891, No. 66, p. 791.

<sup>3</sup> "Des Pleurisies syphilitiques," *Thèse de Paris*, 1893.

<sup>4</sup> *Annales de la Société de méd. d'Anvers*, Sept., 1891.

<sup>5</sup> "Contribution à l'Étude de la Pleurisie syphilitique de la Periode secondaire," *Thèse de Montpellier*, 1894.

<sup>6</sup> "Lues der Pleura," *Berlin. klin. Wochenschr.*, No. 40, 1891, pp. 981 et seq.



yields quite promptly to the last drug. It is interesting to remember that in the older writings the iodide of potassium was by many strongly recommended in pleurisy.

### Angina Pectoris.

This condition, with all its classical symptoms, is in rare cases seen in secondary and tertiary syphilis. It is of paroxysmal occurrence, and both mild and severe in its course, and sometimes accompanied by abnormal sensations of heat and cold or sweating on the left side of the body. It usually yields promptly to antisiphilitic treatment.

The early angina pectoris is probably due to irritative lesions in the coronary arteries, and perhaps in the cardiac plexus; the late form generally results from gummatous affections of the heart. Hallopean<sup>1</sup> and Vitore<sup>2</sup> have published interesting clinical essays on this subject.

### Hyperæmia and Hyperplasia of the Spleen.

With the evolution of secondary manifestations and symptoms, particularly in cases of anæmia and cachexia, in which the condition of the blood is much deteriorated, there will sometimes be found decided swelling of the spleen. The patients complain of a dull, heavy sensation in the splenic region, and in some cases a mild or severe pleuritic pain may be felt. This condition is usually ephemeral, and slowly subsides under antisiphilitic treatment and when the general nutrition improves.

In an essay in which the results of the study of 88 cases are given Quinquaud and Nicolle<sup>3</sup> claim that in the majority of cases of acquired syphilis enlargement of the spleen occurs. It, according to them, usually begins after the appearance of the chancre and the adenopathies, and before the onset of general manifestations. In the first month of the secondary stage the organ becomes and remains enlarged, and its area of dulness may be four inches in extent. According to these authors, the enlarged volume of the organ does not thus early appear to be in proportion to the intensity of the symptoms, and the morbid process is not then materially modified by treatment. At the end of the first year the splenic enlargement begins to diminish in some subjects. It wholly disappears except in cases of malignant course, when it may persist even into the tertiary stage.

Quinquaud and Nicolle think that splenic hypertrophy may aid in diagnosis in the primary period when there is doubt as to the nature of the chancre. In the secondary stage also, when doubtful manifestations are present, it may be of diagnostic import, and they call this a *permanent symptom* of the infection. The absence of splenic enlargement, in their view, shows the eradication of the disease. In my experience, vigorous antisiphilitic treatment soon causes the resolution of the splenic hyperplasia.

<sup>1</sup> "De l'Angine de poitrine d'Origine syphilitique," *Annales de Derm. et de Syph.*, 1887, pp. 747 et seq.

<sup>2</sup> "Un caso di Angina pectoris per sifilide," *Bull. di Clin.*, Naples, 1886, vol. iii. pp. 185 et seq.

<sup>3</sup> "Étude clinique sur l'Hypertrophie de la Rate dans la Syphilis acquise," *Bull. de la Société franç. de Derm. et de Syph.*, vol. iii., 1892, pp. 530 et seq.

Colombini<sup>1</sup> also examined the spleen in eighty cases of syphilitics, and concludes that hyperæmia of this organ is one of the first of the general manifestations of the infection. This author thinks that prognostic and therapeutical indications may be derived from a study of the condition of the spleen, which he thinks remains enlarged, particularly during the first year, and only slowly diminishes in size.

### Jaundice.

In early secondary syphilis and during the first year of the infection there is not infrequently seen a mild and ephemeral form of jaundice. This evidence of hepatic derangement may consist simply of moderate yellowness of the skin of the face, or there may be a dense golden-yellow discoloration. In case of jaundice there is usually chloro-anæmia or asthenia.

This condition is probably due to an irritative process acting upon the common bile-ducts, and not to any structural lesion.

The jaundice of secondary syphilis may last only a few weeks, and perhaps in severe cases, particularly when treatment has not been followed, it may last two or three months. Under the influence of anti-syphilitic treatment and good regimen the yellowness of the skin disappears and the health of the patient becomes restored.

Lasch<sup>2</sup> has published the histories of three cases of jaundice in early syphilis, and from a study of them and of forty-six reported cases of various authors concludes that syphilitic icterus develops in a brusque manner without being preceded by digestive derangements. Syphilitics thus affected may have good appetite and digestion, and usually are not troubled, as patients with catarrhal icterus are, with inability to assimilate fatty food.

In cases of syphilitic icterus there is an absence of any etiological causes, such as are found in those of the catarrhal variety.

The jaundice of syphilis is more frequently found in women than in men. It is usually readily amenable to specific treatment.

### Albuminuria and Ephemeral Nephritis.

Much has of late been added to our previously meagre knowledge of the kidneys and their condition in secondary syphilis.

There can no longer be a doubt that early and sometimes rather late in the secondary stage a mild or more severe form of nephritis may occur.

It is thought by several authors that the early or precocious nephritis of syphilis has the characteristics of the same condition due to other infectious fevers and diseases. Negel,<sup>3</sup> as a result of his studies, concludes that the syphilitic affection is a glomerulo-nephritis comparable to that of scarlatina.

The **symptoms** of early renal syphilis may be entirely wanting, and the diseased condition may only be discovered upon examination of the urine. Then, again, in some cases there is œdema of the lower extremi-

<sup>1</sup> *Giornale Ital. delle Mal. Ven. e della Pelle*, vol. xxx. pp. 1 et seq.

<sup>2</sup> "Icterus Syphiliticus præcox," *Berl. klin. Wochenschr.*, 1894, pp. 906 et seq.

<sup>3</sup> "De la Syphilis rénale," *Thèse de Paris*, 1888.

ties and of the face, and perhaps there may be moderate or copious pleural or abdominal effusion.

Fürbringer<sup>1</sup> has studied the subject in more than 200 cases, and he concludes that there is an essential syphilitic nephritis, and that mercurial treatment tends to cause a mild and ephemeral form of the affection. In 100 untreated cases of syphilis, in which the kidneys were healthy, he found 8 cases which developed albuminuria, the maximum quantity of albumin being 12 per cent. In other cases external and internal treatment produced the same result. In syphilitic albuminuria Fürbringer found renal epithelium, cylinders, and red blood-corpuscles.

Hudelo<sup>2</sup> reports the case of a man who in the fourth month of secondary syphilis presented evidence of Bright's disease, pulmonary apoplexy, with pleural and pericardial effusion. At the autopsy diffuse subacute nephritis, both epithelial and interstitial, with a tendency to contraction in spots, was found by Darier. In another case, reported by Hudelo and Darier,<sup>3</sup> a man forty-nine years old four months after infection presented symptoms of Bright's disease. He died, and at the autopsy a diffuse subacute nephritis, with glomerulitis and fatty degeneration of the parenchyma, was found. As to these results Darier says: "In these cases of syphilis there were no post-mortem appearances to distinguish these kidneys from those of other infectious diseases. Tubercular nephritis is comparable to that of syphilis."

Horteloup<sup>4</sup> lays stress on the curability of syphilitic albuminuria in secondary syphilis, particularly when treated early, even if severe œdema and intrathoracic and intra-abdominal effusions are present. This author also suggests that cold may be a factor in the production of nephritis.

In many cases this nephritis is curable by antisymphilitic treatment, aided by care as to regimen and the use of a milk diet. In some cases, particularly in those who indulge in an excess of alcoholic liquors and who are exposed to cold, parenchymatous changes are produced.

The ephemeral nephritis of secondary syphilis is to be feared, for the reason that it may lead to structural changes in the kidneys.

### Glycosuria.

Tschistiakoff<sup>5</sup> has reported the case of a man whose urine at the date of the secondary syphilitic invasion contained  $\frac{1}{2}$  per cent. of sugar, which disappeared with the development of the roseolous eruption. The fact was ascertained that the patient was not a diabetic before he became infected with syphilis. This author thinks that, owing to disturbances in metabolism at the onset of secondary syphilis, a benign

<sup>1</sup> "Ueber Albuminurie durch quecksilber und lues," *Berlin. klin. Wochenschrift*, No. 21, 1885, pp. 343 et seq.

<sup>2</sup> "Mal de Bright syphilitique précoce," *Bull. de la Société franç. de Derm. et de Syph.*, vol. iv., 1893, pp. 125 et seq.

<sup>3</sup> "Syphilis rénale précoce," *ibid.*, vol. iv. pp. 406 et seq.

<sup>4</sup> "Note sur l'Albuminurie syphilitique," *Annales de Derm. et de Syph.*, 1886, pp. 577 et seq. Also see Wickham, "Note sur l'Albuminurie Survenante, dans le cours d'Accidents secondaires d'Origine syphilitique," *L'Union médicale*, 1886, vol. xlii. pp. 685 et seq.

<sup>5</sup> *Wrach*, 1894, vol. xv. pp. 103 et seq.



glycosuria, characterized by the small amount of sugar excreted, by moderate polyuria, and without excessive thirst or appetite and loss of weight, sometimes occurs.

### Peptonuria.

Impressed with the fact that peptonuria is a condition found in the course of infectious diseases, Raymond<sup>1</sup> searched for it in syphilis, and found that it is of rare occurrence. The cases in which peptonuria was found were those of malignant precocious syphilis and phagedena.

## CHAPTER LIX.

### HEMORRHAGIC SYPHILIS AND HÆMOGLOBINURIA.

ANY of the secondary eruptions of syphilis may be accompanied by hemorrhagic effusion, either around or into the substance of the lesion. It may occur on the lower extremities of those whose general health is unimpaired, and is then not of serious import, or it may occur on various other portions of the body of broken-down and scorbutic persons. In all of these cases the effusion is secondary to the specific process, spontaneous transudation of blood into the skin of syphilitics being quite a rare occurrence. A case of much interest has been reported by Bälz,<sup>2</sup> as follows: A man, aged twenty-five, healthy, but having had typhus fever, when syphilitic one year suddenly and without premonition became covered with a blood-red exanthem. This was composed of discrete and confluent spots varying in size from a millet-seed to a silver dollar. The blood-red color rapidly faded and left slightly scaly, reddish- and greenish-yellow patches similar to those seen in scorbutus. Coincidentally he had swelling of the joints of the little finger, wrist, right elbow, and both feet, due to intra- and periarticular hemorrhagic effusion. The cheeks and eyelids were swollen, but the gums were normal. The urine did not contain blood. Four days later a new eruption occurred simultaneously with an attack of pleuro-pneumonia. For the latter an ice-bag was applied to the chest, resulting in the development of a large patch of effused blood, which slowly subsided, the skin being oedematous and sensitive. A second application of the ice-bag produced a similar result. Under the use of iodide of potash the patient was cured in four weeks. Bälz thinks that syphilis induced in this case a hemorrhagic diathesis. He also speaks of another case of a healthy man who, a short time after syphilitic infection, was attacked by a general hemorrhagic eruption, with epistaxis, bloody urine, bloody stools, and febrile reaction. Several

<sup>1</sup> *Annales de Derm. et de Syph.*, 1890, pp. 68 et seq.

<sup>2</sup> "Ueber hæmorrhagische Syphilis," *Arch. d. Heilk.*, Feb., 1875.

days later a papular syphilide appeared among the patches of effusion, and on the tenth day the man died.

Horowitz<sup>1</sup> reports two cases of men, syphilitic respectively four and five months, who suffered from secondary manifestations of the skin. The papules became hemorrhagic and surrounded by large and small ecchymotic zones, some of which were confluent. In these cases, as in several similar ones, there had been icterus at an earlier date. Horowitz states that he also has seen the case of a young syphilitic woman who died in consequence of nasal, uterine, and intestinal hemorrhage, but whose eruptions did not become hemorrhagic.

Hartmann and Pignot have published an essay<sup>2</sup> in which the history of a goodly number of cases of hemorrhage during syphilis is given. These observers think that hemorrhage is due to specific arteritis, while others think that in some cases changes in the blood may be the underlying cause of its extravasation and effusion.

Hartmann and Pignot, as a result of their studies, conclude that syphilis causes, first, cutaneous hemorrhage into specific eruptions; second, a special form of purpura; and, third, the ordinary purpura, which runs its course during the evolution of the disease.

I have also seen a case of hemorrhagic effusion occurring late in syphilis. The patient, a man forty-six years of age, had suffered severely from various lesions, and of late with extensive ulcerating gummata. Twelve years after infection, being in a cachectic state, he was attacked by a general but not copious eruption of bullæ. These when first seen contained sero-pus, but soon became of a deep-red color, and around them a wide areola of effused blood appeared, with large, slightly-raised hemorrhagic patches between them. The bullæ became large, foul ulcers; the effused patches grew larger, and some coalesced. The patient finally passed into a typhoid condition and died. In this instance the hemorrhagic condition or diathesis was probably caused by syphilis.

Much future study upon this subject is necessary. The interesting question arises concerning hemorrhages in syphilitics whether or not they are in some cases caused by intercurrent infectious processes.

The etiological relation between syphilis and hæmoglobinuria has not as yet been clearly made out, but there is distinct evidence that syphilis acts as a causative factor in this peculiar form of blood-degeneration.

Murri,<sup>3</sup> after extensive observation of many cases of hæmoglobinuria, in fifteen of which the existence of syphilis was clearly demonstrated, has reached the conclusion that this infection is not infrequently the etiological factor in that morbid condition of the blood. Hæmoglobinuria may occur in both early and late syphilis. The syphilitic form presents no distinguishing features from the one due to malaria. Murri thinks, however, that in chronic malaria the fever gives rise to the hæmoglobinuria, while in syphilis that condition causes the fever. Murri relates the case of a man who in the third year of his syphilis suffered from hæmoglobinuria and dermal manifestations. Mercurial treatment, after some disappoint-

<sup>1</sup> "Zur Kenntniss der Hæmorrhagischen Syphilis," *Vierteljah. für Derm. und Syphilis*, 1886, pp. 351 et seq.

<sup>2</sup> "Hæmorrhagies et Syphilis," *Annales de Derm. et de Syph.*, 1886, pp. 1 et seq.

<sup>3</sup> "Emoglobinuria e Sifilide," *Revista clin. di Bologna*, fascic. 4 and 5, 1885.

ments, caused the paroxysms to cease. Later on the man died of severe visceral lesions.

Schumacher<sup>1</sup> also concludes that hæmoglobinuria is not simply an intercurrent affection, but that it really is caused in some unknown manner by the syphilitic infection.

Goetze<sup>2</sup> reports a case of paroxysmal hæmoglobinuria which occurred in an hereditarily syphilitic subject. A girl nine years old showed marked evidence of inherited infection in deformities of the teeth, double keratoiritis, and hyperostosis of the tibia. The attacks of hæmoglobinuria were ushered in by shooting pains in the limbs and region of the liver, by yawning and a sensation of cold, which were followed by a short period of sweating, after which urine of the color of ink was passed. Half an hour later the urine looked normal. Quinine failed to cure, but relief followed the use of the mixed treatment.

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## CHAPTER LX.

### GENERAL CONSIDERATIONS ON THE AFFECTIONS OF THE SKIN, OR SYPHILIDES.

LESIONS of the skin may appear at any period in the course of syphilis, being among its earliest symptoms and not infrequently among its latest.

Syphilitic eruptions are caused by two distinct morbid processes, hyperæmia and cell-infiltration, each of which is extremely chronic in its nature. The hyperæmic or erythematous syphilides present several varieties, and are peculiar to the early stages of syphilis, being very rarely seen later than two years after infection. While hyperæmia is the essential morbid process, we not infrequently find associated with it a certain degree of cell-increase, sometimes so slight as to be inappreciable to the naked eye, and again so marked as to form well-defined patches or nodules. The infiltrating cells of the syphilitic dermal lesions are round, granular, nucleated bodies, averaging  $\frac{1}{3000}$  of an inch in diameter, similar to the white blood-corpuscles in general appearance and analogous to the cells of the initial lesion and of the later gummatous tumors of syphilis. The surprisingly numerous and varied appearances resulting from these two simple processes are modified and complicated by various subsequent changes.

As a general rule, the cell-infiltration is in proportion to the age of the syphilis. Thus, in the secondary period the superficial layers of the skin are involved and papules are developed, while at a later period, the

<sup>1</sup> "Beitrag zum Zusammenhang von Paroxysmalen Hæmoglobinurie und Syphilis," *Verhandl. d. Cong. für Innere med.*, Wiesbaden, 1884, vol. iii. pp. 357 et seq.

<sup>2</sup> "Beitrag zur Lehre von der Paroxysmalen Hæmoglobinurie bei Syphilis," *Berl. klin. Wochenschr.*, 1884, p. 716.



infiltration being deeper and more extensive, tubercles are formed. In the former the changes take place chiefly in the papillary and Malpighian layers; in the latter the derma and the subcutaneous tissue are involved. A tubercle, therefore, is simply a papule of large size. Evidently there can be no distinct line of division between the two lesions, and we frequently meet with intermediate grades of infiltration, to which we may apply the term *papulo-tubercle*. Tubercles may, however, appear early in the course of syphilis, but are usually not seen until after the evolution of a general superficial eruption. A syphilitic pustule may be looked upon as a pus-producing papule, the secretion of pus generally being secondary to the formation of the papule. In some instances, however, the formation of pus seems to precede or to be coincident with the cell-infiltration.

The occurrence of a vesicular syphilide is rare, and has indeed been denied by some authors. It is true that vesicles similar to those of herpes and eczema are not developed, but it is not uncommon to find minute collections of serum beneath the epidermis at the apices of papules, especially those small conical papules which have a more acute evolution.

The existence of a true bullous syphilide in the acquired disease has also been doubted, but we are convinced that it is occasionally developed at a late period in cachectic subjects. The degree of cell-infiltration at the base of bullæ is usually much less than in any other syphilitic eruption.

Thus we find in syphilis lesions of the integument which correspond to those of non-specific origin—erythemata, papules, pustules, vesicles, bullæ, and tubercles—but the syphilitic eruptions present certain peculiar features whose recognition is important.

In addition to the above-mentioned lesions are the syphilitic *gummata* or *gummatous tumors*. These result from cell-infiltration in the subdermal tissue, either limited to this region or involving secondarily the entire thickness of the skin, which may be destroyed, thus forming gummatous ulcers.

A syphilitic eruption may be composed exclusively of one or another of these lesions, or several may be simultaneously developed.

Much confusion has followed the application to syphilitic skin lesions of the classification of non-specific eruptions instituted by Wilan, who placed lichen among the papular, impetigo among the pustular, eczema among the vesicular, and psoriasis among the scaly affections. Such a nomenclature in syphilis is far from being as useful as might be expected. For instance, a papular syphilide in its early stage would be called lichen, but suppose it to be capped with pus, as frequently happens, and the name impetigo must be substituted, or we must designate it by the term pustulating syphilitic lichen. Should the lesion lose its pustular feature, and, becoming chronic, assume a scaly character, no term now in use could express the exact condition, and we should be compelled to add the term psoriasis.

Another objectionable feature in the nomenclature of syphilitic dermal lesions is the use of the word "lupus" in describing certain tubercular syphilitic lesions whose features and course resemble those of the non-specific affections.

I have, therefore, thought best to apply the qualifying adjectives erythematous, papular, pustular, etc. to the generic term "syphilide," using the words ulcerating, serpiginous, etc. in addition as the peculiar features of an eruption, in exceptional cases, may require. We thus avoid the erroneous inference that many of the chief varieties of simple skin affections are caused by syphilis.

Although we may use the word "scaling" in describing certain syphilides, it must be remembered that desquamation does not constitute the lesion, but that the latter consists of infiltrations into the skin in the form of papular or tubercular eruptions, exfoliation of the epidermis being secondary. In some cases the dermal irritation is so excessive that desquamation continues long after the original lesion has failed. It must then be considered merely a sequel of the specific process.

Besides the classification of syphilides in accordance with their elementary lesions, we have one based on the recognized fact that each symptom has a favorite period of development. A strict chronological order is not followed, for a tubercular rash may be met with at an early date, or a papular eruption may be developed very late in the course of syphilis. Some French authors call the early eruptions precocious syphilides (*syphilides précoces*), and limit them to the first eight months of the disease; those of later appearance they term intermediary (*intermédiaires*), which may appear as late as the second year; while the very latest are called tardy (*tardives*), which may appear at any time before the tenth or the twentieth year.

A division which is simpler and more practical, and which we shall employ, is that which places erythematous, papular, pustular, and vesicular syphilides among *secondary* lesions, and tubercular, bullous, ulcerative, and gummatous among *tertiary* lesions. Certain peculiarities are presented by these two classes of lesions.

The early lesions of the secondary stage are distributed symmetrically and generally over the body, involving the superficial layers of the skin; the later lesions of this stage, although extensively and symmetrically spread, are less copious, and show a tendency to localization, and, moreover, invade deeper portions of the skin. The lesions of the tertiary stage are always profound and are less profusely distributed, but they involve more extensive portions of particular regions for which they seem to have a predilection, and they are frequently unsymmetrical. The course of the tertiary lesions is decidedly more prolonged and indolent than that of the secondary.

Much difficulty is experienced in the study of specific skin affections in consequence of numerous modifications which they are prone to undergo. Familiarity with the features of the simple eruptions is essential to an accurate knowledge of syphilitic eruptions. Let us now consider some of the characteristics by which the latter may be recognized.

Their **course**, as compared with that of simple eruptions, is marked by chronicity and absence of inflammatory features. They may be accompanied by a moderate degree of systemic reaction. In some erythematous and papular syphilides of the early period of syphilis the intensity of this reaction and the active character of the eruption may render the diagnosis from one of the simple exanthems very difficult. The actual nature of the eruption is demonstrated by its quickly assuming a sub-

acute course. With the progress of the syphilis the tendency of the eruptions to present a chronic, apyretic character is more marked. Some local exciting cause may usually be found for the hyperæmia and inflammation sometimes attending tubercular, ulcerative, and gummatous syphilides.

### **The Microbic Complications of the Syphilides.**

There are many points as to the nature of certain syphilides which may later on be cleared up by pathological and bacteriological studies. In strict accuracy the only essentially and purely syphilitic skin lesions are those produced by erythema and cell-changes—namely, the erythematous and pigmentary, and the papular, tubercular, and gummatous syphilides, in which, when uncomplicated, there is no suppuration. These dermal affections result directly, without complication, from essential syphilitic processes. The various pustular syphilides of the secondary stage and the rupial, ulcerative, and serpiginous syphilides of the later stage are really the results of mixed processes or infections. In these cases, in some occult manner, the hyperæmia and hyperplasia of syphilis become complicated by the action of pyogenic microbes. Many so-called syphilitic lesions—namely, the impetigoform and the ecthymatous syphilides—very often present an exceedingly striking clinical picture of microbial invasion of an integument which seems susceptible to their influence, and in which the resulting low-grade pyogenic process seems to luxuriate. (See Plate VI.)

It is difficult to understand the essential nature of the variolaform and acneform syphilides. We know that syphilis is not a pus-producing disease, yet in its whole course in many cases the pustulation seems to be equal in intensity, if indeed it does not predominate over, the hyperplastic and infiltrative process. Whether pyogenic microbes lodged in the skin or seated on its external surface are the morbid complicating agents we do not know.

In like manner, later ulcerations, rupia, and the serpiginous syphilides sometimes seem to begin in microbial infection, while at others they commence as essential syphilitic new growths which become attacked by pus-microbes. Much study is yet necessary to clear up these obscure points.

*Absence of Itching and Pain.*—Owing to their indolent nature syphilitic eruptions do not, as a rule, cause any irritation of the skin.

Itching may be present in connection with an early eruption whose evolution is particularly acute. It is never so intense as in a simple eruption, and is much more ephemeral. It is perhaps more troublesome with an eruption occurring on the scalp than elsewhere, and when complicating an early rash it is generally limited to the extremities, the upper more often than the lower.

Too much reliance must not be placed on the statement of a patient that an eruption itches. We must remember that the irritation may be caused by pediculi or by the wearing of flannel, and that some persons have an excessively irritable skin.

Pain is even rarer than itching in syphilitic dermal lesions. A few instances have been recorded of its occurring in connection with a tubercular or a gummatous syphilide.

*Polymorphism.*—The simultaneous occurrence of several varieties



of lesions in the same eruption is an important and common feature of syphilis. It is due to three causes: the chronic course of syphilides, their relapsing tendency, and the changes occurring in the lesions. A similar feature may be observed in some of the simple eruptions, as eczema, acne, and scabies, but in their case the diversity evidently consists of modifications of the original lesion, while in specific eruptions it is in part due to the development of new forms of eruption before the disappearance of preceding ones. Polymorphism is most frequently observed early in the secondary stage, since eruptions are then more numerous; yet it may exist even with the late tubercular eruptions.

*Color and Pigmentation.*—It is important to distinguish the color of the syphilides from the pigmentation which frequently follows them. Their usual tint is pinkish-red, being much more subdued than that of simple eruptions. Even in exceptional cases of acute invasion, in which the color may be unusually bright, it is less intense than in the simple exanthemata. The hue soon fades to a brownish one, which after involution of the eruption changes to a copper-colored, yellowish-brown maculation. Pressure dissipates the color during the early stages of an eruption, but finally the pigmentation, which has been compared to “the lean of ham,” to the color of copper, and to a combination of yellow and brown, becomes permanent.

These pigmentary changes are not peculiar to syphilis, being equally well marked in lichen planus and in cases of protracted dermatitis. They are probably due to deposit of coloring matter of the blood in the affected spots.

In persons whose circulation is feeble the color of the pigmentation may be light yellow, and in cases where the hyperæmia is slight and of short duration no pigmentation at all may be induced.

Syphilis may also produce a primary pigmentation independently of any preceding infiltrating pathological process. This condition is called the pigmentary syphilide.

*Tendency to Assume a Circular Form.*—The early eruptions are generally distributed over the surface without definite order, except in some instances in particular regions, where they may be arranged in a circular manner. This peculiarity is more commonly seen in the case of small papular rashes and in the erythematous syphilide. The latter often relapses in the shape of distinctly marked rings, differing from the papular syphilide, in which the bases of the papules generally merge together and form simply wavy lines or segments of circles or perhaps complete circles. In certain large papules and in some papulo-tubercles involution begins at their centres, leaving the periphery in a ringed form. A similar process may be observed in psoriasis, but in the latter extension of the patch may take place, which is usually not the case in syphilis. Ulcers of the later stages of syphilis may likewise exhibit this tendency. Many other, though less constant, features of syphilitic eruptions will be considered when describing individual lesions.

*Influence of Mercury.*—By many mercury is considered so infallibly curative of syphilitic eruptions that it is termed the “touchstone” in their diagnosis. Its influence is certainly wonderful in most cases, especially in early lesions and in those of an infiltrative character; but

certain ulcerative and chronic forms, particularly those attended by much scaliness, are often quite rebellious.

In general, mercury is very efficient in uncomplicated cases, but in those complicated by other morbid changes, and especially in those which have had a long existence, its effect is much less pronounced.

*The Influence of Intercurrent Diseases on the Course of Syphilides.*—The course of syphilitic eruptions is not infrequently interrupted, or even permanently arrested, by some acute disease. Numerous instances have been reported of the disappearance of an eruption at the outset of an inflammatory affection of the lungs, of acute articular rheumatism, of various adynamic fevers, and of acute cerebral disease. Jullien mentions the remarkable case of a young man who was vainly treated by Diday for lingual mucous patches and a scaling palmar syphilide, who was finally cured during a general eruption of furuncles.

Variola and varioloid have been known to have a similar effect. It was once claimed that syphilis could be cured by vaccination, but careful trial of this means has proved its uselessness.

Our knowledge of the influence of erysipelas on the course of syphilitic eruptions is derived chiefly from the French.<sup>1</sup> Not only superficial lesions, such as papules, mucous patches, and condylomata, but deep and diffuse tubercles and even active ulcerations, are affected; not only lesions within the actual range of the erysipelatous process, but even those at a distance, are influenced by it in some obscure way, even after the failure of well-directed treatment. When, however, the syphilitic diathesis has a malignant character, erysipelas is likely to be a fatal complication.

This healing action of erysipelas on syphilitic neoplasms is undoubtedly due to the changes produced in the tissues by the Loeffler bacillus or its toxins. The remarkable action of this microbe upon sarcomatous new growths is perhaps in essence the same as that which it exerts in syphilis. This feature in bacterial life is very significant and important, and as time goes on it may perhaps prove of much benefit in the treatment of syphilis.

That traumatic as well as idiopathic erysipelas may have a curative effect was proved in a case reported by Mauriac, in which well-marked syphilitic lesions were dissipated by an attack of the disease which followed their excessive cauterization. The practical value of this fact is limited by our admitted inability to excite and control an erysipelatous inflammation.

Intercurrent diseases have no influence upon the syphilitic diathesis, and therefore no power to prevent relapses.

*Unusual Modes of Evolution.*—The appearance of a general eruption is looked upon as the indication of constitutional infection, but the first eruption may be limited, and a general rash may not be developed for several weeks. In some cases only two or three dermal lesions can be found at the usual date of invasion. Should the eruption be erythematous, the spots soon become coppery, and remain in a chronic condition; if papular, the papules are sluggish, and usually leave a pigmented

<sup>1</sup> The most complete brochure on this subject is that of Mauriac ("Étude clinique sur l'influence curative de l'Érysipèle dans la Syphilis"); and an important case has been reported by Deahna (*Vrtljschr. f. Dermat.*, vol. iii., 1876, p. 57).

spot. In connection with these scanty lesions the patient may suffer from syphilitic pains in the head, in the bones, etc., and perhaps may have erythema of the fauces and high temperature. Within two to six weeks the usual general eruption follows.

*The Localization of the Syphilides.*—Syphilitic eruptions are often found in regions where simple skin lesions are seldom or never developed.

Secondary eruptions appear on the scalp, and especially at its margin on the forehead, at the angles of the mouth, on the alæ of the nose, about the anus and upon the genitals, near the umbilicus, in the inguinal fold, between the toes, and upon the palms and soles. The supra- and infra-clavicular and sternal regions, where simple and parasitic eruptions are often found, are rarely the seat of specific exanthems, and on the dorsum of the hands the latter are not often seen: Regions rich in sebaceous and hair follicles are, as a rule, less frequently invaded by simple than by specific eruptions. The annular forms of simple erythema may occur on any part of the body, while these forms of the erythematous and the papular syphilides are more likely to be limited to the neighborhood of joints, the anterior and inner surfaces of the extremities, and the gluteal regions.

The papular syphilides are prone to be developed on the palms and soles.

Later eruptions are generally seated upon the nose, the lips, and the scalp; they are found upon the scapular, sternal, and gluteal regions, and more often on the legs, near the joints, than on the thighs.

The early eruptions, especially the papular syphilides, are very likely to form a segment of a circle at the border of the scalp, which has been called the "*corona veneris*." It is a mistake to suppose that the papular eruption is the only one which may be developed in this way, since most secondary, and even tertiary, syphilides seem prone to develop here.

*Characters of the Scales and Crusts of the Syphilides.*—The scales of specific eruptions are thinner, less numerous, and, as a rule, less glistening than those of simple eruptions, and they are very rarely imbricated. They may consist of epidermis only, when they have a dull-white color, or they may be formed chiefly of serum, when they are yellowish or brownish. The scales are never removed in large patches, as in psoriasis, since the inflammation is of such a low grade that exfoliation is slow and scanty.

The crusts of syphilitic pustules and ulcers are also peculiar. Those of small pustules soon dry, and are seated upon an indurated base; those of impetigo and eczema are placed in a slight depression of the inflamed skin. The crusts of larger pustules are dark-brown or greenish-black, differing from those of ecthyma and scabies, which are yellowish-brown. If elevated, the syphilitic crust is seated upon a deep ulcer with brownish-red infiltrated base and margins; in a simple eruption the ulcer is more superficial, its base is inflamed, and it has reddish, violaceous borders.

The crusts of rupia have no analogue in dermatology. They are of a brownish-black color, are conical and distinctly laminated, and they rest upon a surface which is bathed in viscid pus, or, as Zeissl puts it, "they swim upon and are kept afloat by pus." Their shape and structure are due in a measure to their slow formation.



The crusts of late syphilitic ulcers have a brownish-black color and a rough, uneven surface, and resemble a dirty oyster-shell; the crusts of lupus are of a bluish-brown mixed with yellow.

*Peculiarities of Ulcers and Cicatrices.*—Syphilitic ulcers may be round, oval, kidney-shaped, or of the form of a horseshoe. The ulcers of lupus frequently assume similar forms, but the lesions of syphilis are generally more numerous, more extensively distributed, and more polymorphous than those of lupus. The character of the crusts, the rapid progress and regular margins of the ulcer, and its proximity to a joint, the general history of the case, and its amenability to treatment, distinguish a syphilitic lesion. The margins of a lupoid ulcer are everted, softer and more violaceous, and are frequently studded with reddish-blue tubercles, while the surrounding tissues are much swollen. The cicatrices of syphilitic ulcers, especially where they have been numerous, are often diagnostic. They are distinctly rounded or oval, quite smooth, and seldom traversed by fibrous bands except at the joints; they are frequently perforated with minute holes, the sites of former follicles, when they are more or less depressed, and when mature are quite pliable. Their brownish-red color slowly fades from the centre to the periphery, until there remains a white shining surface surrounded by a narrow areola of brown pigment. A lupoid scar, on the contrary, is generally irregular in outline; its surface, which is not always depressed, but may be on a level with the general surface, or even elevated by the subjacent thickening, is very uneven and is crossed by numerous fibrous bands; it has not a shining appearance and its areola is bluish-red. Finally, false keloid is more frequent upon lupoid than upon syphilitic cicatrices.

The cicatrices which sometimes follow papular syphilides are small, more or less aggregated, and at first pigmented. They are recognized by the situation and grouping of the scars, the coexistence of other lesions or their sequelæ, and by the history of the case.

*The Odor of Certain Syphilitic Lesions.*—Some observers claim that syphilis always gives rise to a distinctive odor. There is no doubt that the discharges from certain lesions possess an offensive and somewhat peculiar smell. Mucous tubercles, when seated upon the genitals or in folds of integument, yield a secretion, often combined with that or sebaceous and sweat follicles, which has a sickening, penetrating odor certainly never perceived in other lesions. The odor in some cases of extensive gummatous and tubercular ulcerations, where the secretion is abundant and the patient uncleanly, is heavy and nauseating.

*General Hints in Diagnosis.*—In the diagnosis of syphilides the foregoing features collectively are of the greatest value. In every case the whole eruption should be reviewed; its extent, copiousness, configuration, and general appearance should be carefully noted; its mode of invasion, its concomitant symptoms, and its course should be determined by careful questioning and observation. With regard to the eruption itself, we must observe whether it is composed of one variety or of several forms of lesion, and, if the latter, which predominates. For instance, in a roseolous eruption we judge of its extent, its tendency to development in certain localities, its configuration, whether the spots are isolated or grouped in rings; then we consider whether the spots themselves are in their early hyperæmic stage, or whether they have become pigmented

or perhaps slightly papular and scaly. By comparing the number of erythematous and of pigmented spots we assure ourselves of the age of the rash and whether its course has been rapid or chronic. We must also learn the general condition of the patient and whether other tissues have been affected.

In case papules, pustules, and scaling patches are associated with erythematous spots, we must decide which lesion predominates, and whether they are not mere phases of development of the same process. We may perhaps learn that the red spots become pigmented and slightly papular where here and there are papules which change into pustules, vesicles, ulcers, or scaling spots. We observe whether the lesions have a tendency to unite and form patches. In this feature syphilis is peculiar, differing radically from most of the simple eruptions.

In case of several varieties of lesions which may undergo various changes, each one runs its course quite distinct from the other. This is quite different from what happens in simple polymorphous eruptions. We may have simple erythematous patches, papules, and pustules associated, but they are related to each other in the development of one inflammatory process, and they have a tendency to blend and form a homogeneous eruption, as in eczema and scabies. In some cases of acne papules and pustules are scattered together, yet a bond of union is always found to exist between them in their inflammatory follicular origin, while they have other features which differ from those known to be peculiar to syphilis.

### Zoster and Zosteriform Eruptions in the Course of Syphilis.

The exact relation of herpes zoster to syphilitic infection is a question yet to be settled, though several authors entertain the opinion that the dermal nervous disturbance may in some cases be etiologically associated with the general infectious process. Trapeznikoff<sup>1</sup> reports the case of a young man having a chancre and roseola who was attacked with severe pain in the left temporal and frontal regions and marked fever, which were followed by a typical zosterian eruption which was seated on the left side of the neck, on the ear, the tongue, and the left eyelid. As a result of mercurial treatment this nervous affection was much improved in six days; then on leaving off the medicine all the severe symptoms returned. Mixed treatment was then administered and the eruption was cured. Trapeznikoff believes that the syphilitic infection was the underlying cause of this nervous outbreak.

Jullien<sup>2</sup> also reports a very interesting case. It was that of a young syphilitic woman who for five days suffered severe pain in the left chest. This was followed by a red linear, slightly elevated eruption, without vesicles, which looked like zoster and ran down the arm and on the side of the chest, and ended in the median line. Jullien is disposed to look upon this eruption as an evidence of the syphilitic infection. In the discussion of Jullien's case Besnier and Fournier make the diagnosis *zona fruste chez un sujet syphilitique*.

<sup>1</sup> *Medicina*, Nos. 21 and 22, 1894.

<sup>2</sup> "Eruption zosteriforme dans le Cours de la Syphilis," *Annales de Derm. et de Syph.*, 1894, pp. 1254 et seq.

A similar case to Jullien's is reported by Gaucher and Barbe.<sup>1</sup> It was that of a young woman who had a linear papular eruption following severe neuralgic symptoms of the last left intercostal nerve. This eruption was followed, under similar circumstances, a year later by an eruption on the right side involving the nerves of the lumbo-abdominal plexus. This subject is worthy of careful study, and until more light has been thrown upon it it is not well to indiscriminately pronounce all cases of zona occurring in syphilitics to be due to specific infection.

## CHAPTER LXI.

### THE EARLY OR SECONDARY SYPHILIDES.

#### The Erythematous Syphilide.

SYN.—Syphilitic roseola, Macular syphilide, Exanthematous syphilide, Syphilis cutanea maculosa.

The erythematous syphilide is usually the earliest syphilitic eruption. It probably exists in all cases of syphilis, but may escape observation on account of the extreme faintness and delicacy of its pink spots, or its scantiness, or by reason of its forming only a part of an eruption which is chiefly papular or pustular.

The lesion consists of round or oval spots, with distinct or irregular outlines of an average diameter of about one-half of an inch. Their color varies from a delicate rosy pink to a decided red or even a purple hue. In some cases there may be only a mottling of the skin, or the eruption may be so faint as to be invisible except on careful inspection or in an oblique light. Exposure to cold brings the spots into prominence, while they disappear in the general hyperæmia of the surface from increase of temperature, and show themselves more clearly in the reaction which follows. At first the spots may be effaced by pressure, but about the end of the first month they may assume a grayish-brown or coppery tint which is permanent. This tint appears earlier in exposed regions and on the legs, perhaps owing to peculiar conditions of the circulation. Sometimes the eruption disappears without this change of color. There is seldom either elevation or scaling of the surfaces of the spots.

The erythematous syphilide requires a week or ten days for its complete development, but individual patches reach their full size in a day or two, and show no tendency to coalesce or to form circles. In rare cases of great intensity, or from any cause which stimulates the capillary circulation, the whole body may be invaded by the eruption in a single day.

The spots may be first seen in the vicinity of the umbilicus, soon extending to the thorax, sometimes following the line of the ribs, and finally, in severe cases, being closely crowded together over a large por-

<sup>1</sup> "Syphilide papulo-squameuse zoniforme du Thorax," *Annales de Derm. et de Syph.*, 1894, pp. 535 et seq.



tion of the surface. In exceptional cases they appear first on the face. In mild eruptions the spots are most numerous on the sides of the trunk and on the inner surfaces of the extremities. On the genitals of either sex the macules are prone to hypertrophy, and hence we frequently see condylomata lata coexisting with roseolous patches in these regions. Similar changes are noticed about the anus, the umbilicus, the nose, and the mouth, and in the fold of integument below the breasts. A limited number of patches may be found on the palms and soles which may be diffuse or slightly elevated and scaly. The dorsal surfaces of the hands and feet are rarely invaded. But it is very common to see a well-marked, even intense, eruption on the palms of the hands and the soles of the feet. The spots are of irregular roundish outline of deep-red, even purplish, color, and are also found scattered on the fingers. In many cases little masses of epithelium, somewhat salient also, but deeply imbedded in the superficies of the skin, are seen scattered over the palm and the fingers, particularly near the natural furrows. This whole condition is admirably shown in Fig. 197. A common region is the lower two-thirds of the forearms and the wrists. The neck is frequently exempt, or an eruption on the trunk may extend by occasional spots along the back of the neck to the scalp.

FIG. 197.



The erythematous syphilide of the palm, with epithelial hyperplasiæ.

When the face is invaded the macules are developed more freely about the nose, mouth, and chin, and especially on the forehead at the border of the scalp, where they are often associated with minute follicular elevations, which become crested with sebum and may be mistaken for pustules. Many of the so-called "scabs" on the scalp have this origin. These patches at the margin of the scalp are often very irregular and confluent.

This eruption on any part of the face is usually covered by fine adherent scales of epidermis or by thin yellowish-white crusts, which give it a smooth, shiny appearance.

The pale-rose or pinkish eruption, which so often escapes detection, is usually of ephemeral duration. The spots rarely become elevated, and more rarely the seat of scaling, and they disappear as they appeared, suddenly and quickly. It is not uncommon to see this eruption in its subdued form coexist with well-defined erythematous spots on the face, forehead, and the flexor surfaces of the arms. While, in general, the concomitant systemic disturbance is mild, very often it is severe with this rash.

The second or more hyperæmic form of the erythematous syphilide usually appears by prompt and comparatively rapid invasion, and is often accompanied by marked elevation of temperature, malaise, rheumatoid pains, and neuralgias. The eruption begins as pinkish or rosy spots, which quite rapidly become darker until a rather deep pinkish red is observed. The irregularly and generally distributed spots are at first of a grayish red, which soon assumes the purplish tint. Very often with this deepening of color punctæ of even deeper hue appear at the orifices of follicles. Again, at these follicular openings circumscribed cell-increase occurs, forming very minute papules, which has given to the eruption the name *roséole piquette* or *granular roseola*. In some cases, usually in only a certain number of spots, there is, besides the hyperæmia, moderate cell-increase into the papillæ, producing a slight salience of the lesions—a condition called *roséole papuleuse* and *roseola urticata*.

In this variety there is no elevation of surface, the spots are sharply margined, and very soon become covered with minute scales.

This form of the erythematous syphilide is peculiar for its chronicity, since the purplish spots remain unchanged for weeks, and perhaps as long as three months. Then they gradually become grayish brown, then coppery, and finally a yellowish buff, when they disappear, the process of involution sometimes occupying several months. More or less desquamation is often observed in this syphilide from its period of development to its decline.

The faint and dark forms of this eruption may consist of numerous closely-packed and generously-distributed spots or a more or less sparse eruption. In some cases, particularly of the dark spots, coalescence into patches of a number is seen, chiefly about the joints or on parts subjected to pressure and irritation.

There is a third form of the erythematous syphilide, not at all uncommon, but which has not been clearly described. It consists of small well-marked, subdued-red spots, having a blotchy or irregular outline, oftentimes gradually lost in the surrounding skin, and averaging from two to four lines in diameter. These spots, besides being readily seen, are as easily felt as very minute little rough prominences of the skin. The lesion is, though elevated, not at all papular, and close inspection shows that its salience is due to the marked localized hyperæmia, particularly around the follicles. This eruption has an individuality of its own, is wholly different from the *roséole papuleuse* of the French, comes out with tolerable promptness, and is seen in its most characteristic form on the anterior aspect of the trunk, less so on the back, limbs, and face, where





PLATE V.



ANNULAR FORM OF THE ROSEOLOUS SYPHILIDE.

its so-called elevation is less marked. It is blotchy, persistent in its course, becomes scaly quite early, and on its decline subsides into small pigmented spots. While we know nothing of its histology, its clinical appearances impress one with the idea that the focus of hyperæmia is the sebaceous follicles, and that the circumambient erythema results from that.

In their **course** these three clinical forms of the erythematous syphilide present considerable variation.

### **Annular or Circinate Eruption.**

In relapses of the erythematous syphilide during the first year of infection the eruption sometimes appears in the form of perfect or broken rings. This annular or circinate eruption is usually limited as to the number of the efflorescences, and is generally localized in certain regions. The rings may be quite broad or very thin, and they may be merely erythematous, or they may be slightly elevated and moderately scaly. Sometimes several rings or parts of rings are seen enclosed within a larger ring. In some cases this enclosure of rings within rings is strikingly perfect in appearance. The neck, the forearm, the shoulders, and the chest and the thighs are the most constant sites of the annular roseolous syphilide. There may be as many as fifty and as few as three or four rings. In some cases this eruption shows a marked tendency to relapse, particularly within the first two years of infection. In very exceptional cases this form of eruption appears as late as the third, fourth, or fifth year of syphilis. In some cases the rings look like deep-seated, very dull-red mottlings of the skin, particularly where it is thin and fine. In many instances patients complain that they have these so-called ringworms for months and years. These ringed eruptions, as a rule, show no tendency to peripheral increase.

Cases of syphilis in which this affection appears at late dates are sometimes very rebellious to treatment.

About the face, arms, palms, the soles of the feet, and the inner aspect of the forearms relapses of the erythematous syphilide are developed in the form of round or oval or gyrate patches, which show a tendency to increase in size at their margins. The patches are of a deep pink or red, and sometimes they have a salmon tint. At their margins there is very commonly a scaly, somewhat elevated border, and from this surface minute scales may be shed. The annular form of the erythematous syphilide is well shown in Plate V., in which a seborrhœic feature may be observed. With this syphilide, when it appears on the head, there is usually a concomitant alopecia.

### **The Symbiosis of Syphilis and the Seborrhœic Process.**

In some cases of erythematous syphilide of the face, neck, and upper part of the trunk there seems to be an interlocking or symbiosis of this specific process with the seborrhœic process, which is caused by some micro-organism. The syphilitic eruption seems to follow the evolution and development of the seborrhœic process. The erythematous spots become slightly elevated and decidedly scaly, the scales having the dirty, somewhat greasy appearance of those of the simpler process. The redness

is dull and of the salmon tint. The clinical picture of the symbiosis is well shown in Fig. 198, in which scaly spots and patches are seen on the forehead, ala nasi, around the mouth, and on the chin and neck. This is a good example of what Unna terms the seborrhœic facies.<sup>1</sup>

FIG. 198.



Erythematous syphilide complicated by the seborrhœic process.

In exceedingly mild forms of this syphilide there is probably no other change than temporary capillary stasis, and occasionally, in debilitated subjects, hemorrhagic effusion. In chronic cases a proliferation of cells occurs, which is described by Biesiadecki as follows: "We find the walls of the capillaries studded at this point with numerous nuclei, projecting on their inner and outer surfaces, and surrounded by a row of cells here

<sup>1</sup> The reader is referred for further information to Unna's paper, "Syphilis and Eczema Seborrhoicum," *British Journal of Dermatology*, Nov. and Dec., 1888, and to one by me, entitled "The Seborrhœic Process and the Early Syphilitic Eruptions," *Journal of Cutaneous and Gen.-urin. Diseases*, May, 1890.



and there interrupted. These cells exactly resemble in size and structure white blood-corpuscles or the cells of dermatitis. They are situated around the vessels in a clearly bounded space. The adventitia of the vessels in the region of the macule encloses round and spindle-shaped cells. This exuberance of cells is most marked in the adventitia of vessels running toward the papillæ; their calibre is contracted, while that of the capillaries in the papillæ is somewhat dilated. Neither the cells nor the fibres of connective tissue show any appreciable change; only here and there granules of brownish-yellow pigment are interspersed. The syphilitic macule must therefore be regarded as a disease of the blood-vessels, as shown by the increase of their granular and cellular elements." Further microscopic observations have been made by Kaposi, who confirmed the occurrence of cell-changes in the capillary walls, and also observed cell-infiltration of the papillæ. It is quite probable that these combined changes occur in erythematous spots, which are more or less papular.

In very chronic eruptions several minute specks of darker tint appear on the surface of some of the roseolous patches, indicating a more intense hyperæmia at follicular openings. They are usually a little above the level of the patch, and are frequently traversed by a hair, and their pigmentation is generally more persistent than that of the surrounding patch.

The **course** of the erythematous syphilide is slow, and except in cases of active invasion it is not attended by special irritation or heat of the skin.

Its **duration** depends on the degree of the hyperæmia and on treatment. A faint rash often disappears spontaneously, even within a week, under the use of mercury. After pigmentation has taken place internal treatment needs to be supplemented by the external use of mercury in ointment, lotion, or, still better, the vapor bath.

A relapse of this syphilide may occur during the first year of contagion, and is generally less copious than the primary eruption. The macules are more localized, and are likely to assume the circular form, which is never seen in the initial eruption, and they are attended by less febrile reaction. In certain cases as many as three and four recurrences have been observed, the forearms and gluteal regions being the parts most often affected.

*Coexisting Lesions and Symptoms.*—On account of its early appearance the erythematous syphilide is often associated with many other lesions, one of which is the fully-developed initial lesion. Indurated ganglia may also be found, and hyperæmia or mucous patches of the fauces. Where two surfaces of integument are in contact, the confluence of erythematous spots may form large inflamed patches, sometimes mistaken for intertrigo.

They have sharply circumscribed margins and superficially ulcerated surfaces, which secrete a viscid offensive fluid. They are often accompanied by papules about the hair-follicles, or even by pustules and condylomata lata. Alopecia and affections of the nails sometimes occur at this period. Slight periostitis and, in bad cases, osseous affections may be present. Superficial scaling of the palms or even of the soles may be observed. Iritis is rarer than in a general papular eruption. In a person with a long prepuce and of uncleanly habits patches of erythema on the mucous membrane of the glans may result in quite destructive ulceration.

**Diagnosis.**—The diagnosis of the erythematous syphilide is to be made in its form of hyperæmic patches, in its pigmented condition, and in its ringed form.

In its hyperæmic stage it may be mistaken for rubeola, scarlatina, or the erythema following the ingestion of balsams or the use of mercury.

The mode of invasion, the absence of severe general symptoms, and the circumscribed and indolent character of the rash will usually enable us to distinguish it from rubeola and scarlatina; moreover, the presence of catarrhal and conjunctival symptoms in the former, and of gastric and throat symptoms in the latter, will be of assistance.

The rash caused by cubebs, copaiba, tar, etc. is always attended by high fever and serious gastric disturbance, and the patches are many of them very large and œdematous or like the wheals of urticaria. It soon fades on cessation of the exciting cause.

An eruption may be caused by either the internal or external use of mercury. It appears suddenly in the form of very large hyperæmic patches of a bright-red color, which soon become dull and quickly fade, leaving no trace. It is not infrequently mistaken for a relapsing eruption.

One of the most frequent errors in the diagnosis of syphilitic eruptions is that of confounding the pigmentary stains of the erythematous syphilide with tinea versicolor. They somewhat resemble each other in color, but that of tinea is more yellow, and many of its patches are very large, and they are always accompanied by some extremely small ones. Tinea is, moreover, slightly pruritic, and its scales contain the *microsporon furfur*. The patches of tinea are always found over the sternum, where syphilitic eruptions are rare, and they are much less scattered than those of the syphilide.

In rare instances of slight elevation and scaliness the rings of the erythematous syphilide may be mistaken for tinea circinata, particularly when this eruption is of a pink or red color. The scales of tinea circinata always contain the parasite *trichophyton tonsurans*.

Pityriasis maculata and circinata are sometimes mistaken for the erythematous syphilide. In the simple eruption the patches are of a decidedly more inflammatory nature. There is no history of syphilis; the ganglia are unaffected, and there are not present on the skin, mucous membrane, or scalp, as there commonly is with the erythematous syphilide, concomitant lesions whose nature is readily perceptible. I have seen cases of the simple eruption which required much study to determine the fact that it was not due to syphilis. The syphilitic rings are much more numerous, do not, as a rule, increase in size, and the area of enclosed skin is usually unaltered.

### The Papular Syphilides.

These most important dermal lesions of syphilis are composed of circumscribed infiltrations into the superficial layers of the skin, and present two varieties—the *conical* or *miliary* and the *lenticular* or *flat*.

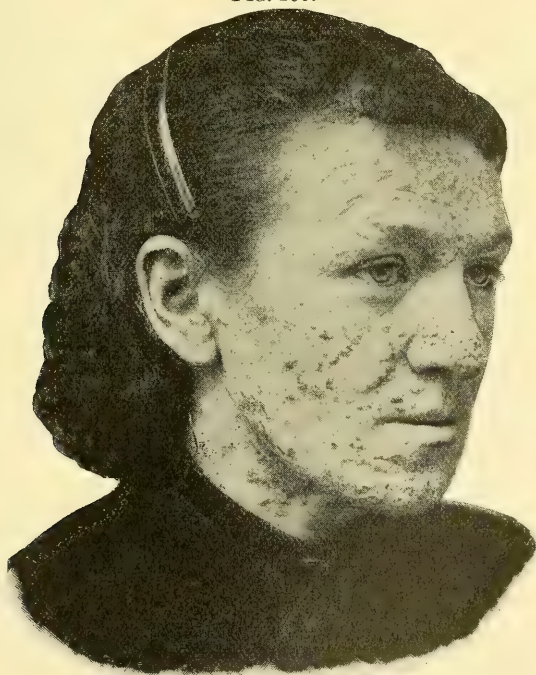
They may constitute the first symptom of the secondary stage, or they may be combined with the erythematous syphilide. In relapses they frequently occur alone, or are by far the larger proportion of a recurring eruption. They may be seen even in the tertiary stage, and they merge

into the tubercular syphilide by intermediate grades of papulo-tubercles. Some of these intermediary papules are attended by an epidermal proliferation, and have therefore sometimes been erroneously called "squamous syphilides." The various changes of form and distribution which the papules undergo sometimes give them a strong resemblance to simple skin lesions.

**THE MILIARY PAPULAR SYPHILIDE.**—The *miliary papular syphilide* has two distinct varieties, one composed of *large* and the other of *small papules*.

Some of the *small papules* are about the size of a pin's head, while others are two or three times as large. They consist of distinctly limited, conical or rounded elevations of the skin, sometimes umbilicated, and in their early stages they have a deep pinkish-red color. When forming the first eruption of the secondary period or an early relapse they are distributed over the whole body, sometimes closely packed together, and particularly copious on the forehead, about the nose and chin, on the

FIG. 199.



The small miliary papular syphilide of the face.

back of the neck, on the outer surfaces of the extremities, and upon the scapular and gluteal regions. The papules may be arranged in groups in the form of circles or segments of circles, or like the letter S or the figure 8. Sometimes the papules, composing rings which may have a diameter of half an inch or two inches, fuse together and lose their individual shape. The circular form is assumed only in the regions referred to, while elsewhere papules may be seated without definite order.



In a general eruption papules may be seen on the backs of the hands and upon the scrotum and penis, where they usually become excoriated and are transformed into condylomata. Unlike the flat papules, these are rarely accompanied by condylomata about the anus in the male and the vulva in the female. After frequent relapses the papules are generally less numerous and less confined to particular regions, while the ring-form becomes a more prominent feature. When the eruption occurs late in the secondary period it may be seen in but one region, and may even be unsymmetrical.

This eruption usually begins about the face and neck, and is fully developed at the end of two weeks. In some instances its evolution is so rapid that it has been called the "acute papular syphilide." In late relapses the papules appear as slowly as any other syphilitic eruption. Many of the papules are seen to be at the openings of follicles—a feature which is more noticeable in this than in any other form of syphilitic papule.

After their complete development the papules remain unchanged for a time. In some cases new papules, and exceptionally pustules, appear among the old ones. Soon their color changes to a sombre brown, and finally to a coppery hue. Small scales of epidermis, frequently in the form of rings, which correspond to the margins of papules, are detached by the infiltrative process beneath. This feature was regarded by Bielt, who first described it, as of considerable diagnostic importance. A marked tendency to further desquamation is observed only in chronic cases and in regions where the epidermis is thick; it is sometimes so decided as to resemble the early stage of psoriasis.

Frequently a few of the papules are converted into vesicles or pustules by the accumulation at their apices of a minute quantity of serum or pus. They may remain in this condition for a long time. Generally the fluid dries and forms a minute crust which may fall off spontaneously, leaving the papules apparently in their elementary state. In some cases pustules form, which may dry or become ulcers.

The occurrence of distinct groups of papules which have undergone these changes, generally on the face, about the mouth, and on the forearms and backs of the hands, has perhaps led some authors to admit the existence of a vesicular syphilide.

In some instances papules about the nose and mouth have a yellow crust composed of sebaceous matter from the follicles around which they are developed. On account of the appearance of the crust and the superficial infiltration of the papules the case might be mistaken for one of seborrhœa.

When uninfluenced by treatment the course of the eruption is chronic. In its early stage it yields slowly to treatment, but after long persistence it becomes very obstinate, and requires local as well as general treatment. Its rapid and early disappearance is desirable, since permanent atrophic spots like those of variola remain after a lesion which has had a long existence. These spots are pigmented, and they become white only after several months. Pigment may also be deposited when atrophy has not occurred.

The diagnosis is generally easy, at least in the early stage. The eruption may be mistaken for the punctate form of psoriasis or for certain cases of lichen pilaris and lichen planus.

In psoriasis the papules tend to form patches of an inch or more in diameter, and the scales are copious, silvery, and imbricated.

Lichen pilaris is an inflammatory affection, chiefly of hairy regions, and is accompanied by intense pruritus, and the papules often form patches of thickened skin.

In lichen planus the papules are flatter, less uniform, more commonly umbilicated, are always pruritic, and are more likely to lose their original character by confluence.

Moreover, with the syphilide we have the specific history and possibly the coexistence of other and distinctive lesions.

In addition to the small conical papules, there are others as large as peas, markedly conical, and having an elevation of about a line. They rarely appear in large numbers or constitute an early general eruption, but are found at the time of a relapse mingled with the smaller papules, with pustules, or with an erythematous syphilide. They are more profuse on the back and buttocks than elsewhere. Their evolution is slow. Their bright-red color soon fades, and they are quite apt to pustulate and form ulcers. They have no orderly arrangement either in groups or in circles. They yield more readily to treatment than the small papules, and seldom leave atrophic and coppery spots.

This form of papular syphilide may be mistaken for acne, especially on account of its appearance on the back. In acne the lesions are most abundant about the face and shoulders; they vary greatly in size, and are accompanied by more hyperæmia. Acne usually begins about puberty and has a history of many recurrences.

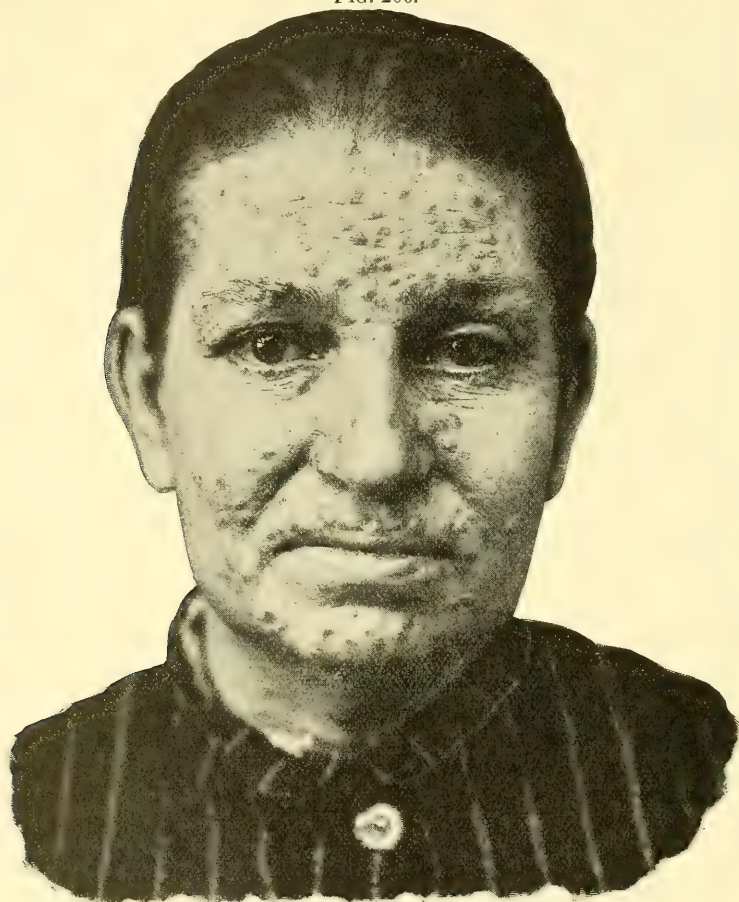
THE LENTICULAR PAPULAR SYPHILIDE.—There are two varieties of flat papules caused by syphilis—the *small* and the *large*. The *small papules* frequently occur in the form of a general eruption; this is rarely true of the large papules, which are usually seen concurrently with a small papular eruption, an erythematous or perhaps a pustular syphilide. These two forms of papules present striking differences.

THE SMALL FLAT PAPULAR SYPHILIDE.—The *small papules* begin as minute red spots, which rapidly increase until they reach a diameter of one-eighth to one-fourth of an inch and an elevation of one-third to one-half a line. They are either round or oval, have flat surfaces, and rounded and distinctly limited margins. A few papules may be slightly depressed at the centre, but we do not find them surrounding follicular openings or pierced with hairs. In the early and general eruptions the papules are scattered and show no tendency to fuse together. In relapses they are less numerous, and are more likely to be grouped and arranged in a circular form.

*Mode of Distribution.*—The papules are first seen about the shoulders, or at the back of the neck, or on the sides of the thorax, and are soon followed by others on the forehead at the margin of the hairy scalp, with perhaps a few on the face, chiefly about the nose, mouth, and chin, and on the anterior surface of the neck, rarely on the ears. At the same time or soon after the trunk is invaded, particularly the back, and the papules may follow the line of the ribs. As a rule, the supra- and infraclavicular regions are wholly spared. The papules are copious in the hypogastric region; but few are seen over the sternum; they are numerous over the anterior surface of the shoulders, but comparatively

sparse on the outer surface of the arms, while they are more numerous on the inner or flexor surfaces, especially near the joints. Few are seen on the dorsum of the hands, while the palms are more freely supplied. They are unusually numerous on the gluteal regions, and are not infrequently found upon the penis, the mons Veneris, and in the inguinal

FIG. 200.



Small flat papular syphilide of the face.

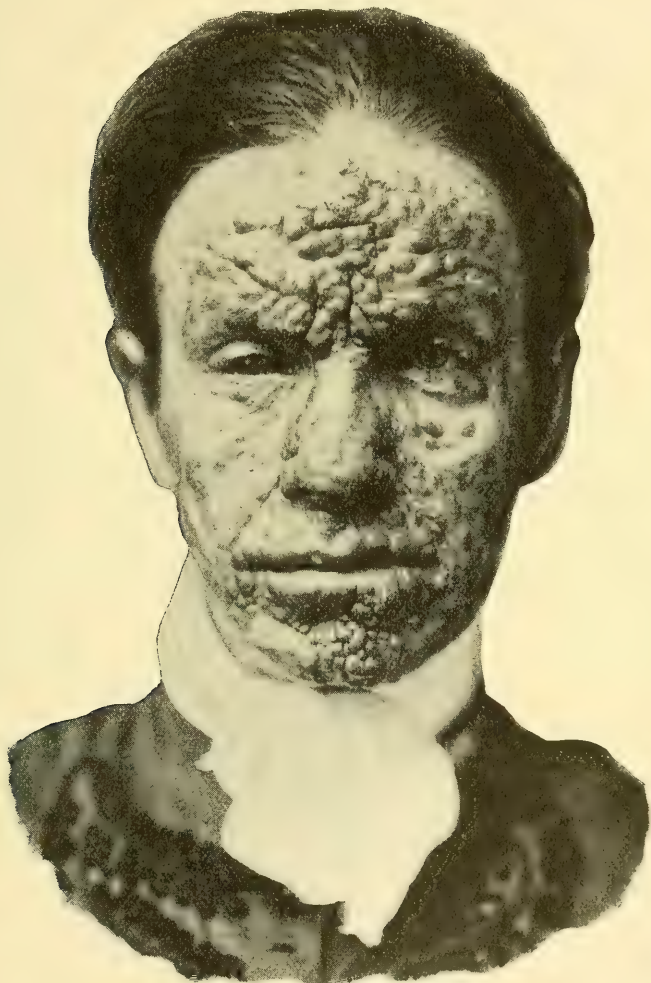
regions. They are more plentiful on the inner than the outer aspects of the thighs, and they either do not extend below the knees or are sparsely distributed upon the inner surfaces of the legs and sometimes upon the soles. The face is spared by this syphilide more frequently than by the small miliary variety. It sometimes assumes the form of the so-called "corona Veneris," and occupies the forehead where the hat presses; it is seen upon the *alæ nasi* and about the mouth, and shows a marked tendency to development near the junction of the skin with mucous membranes. In rare cases the papules are very copious and hypertrophic, and really constitute papulo-tubercles upon the face, where they cause a



peculiar expression, similar to that sometimes seen in true leprosy, which is called by some authors "syphilitic leontiasis." (See Fig. 201.)

The color of the small flat papules varies in different regions of the body and in different persons. In their early stage it is a pinkish-red, which soon becomes brownish or coppery; this change occurs first on the face, especially the forehead, then on the legs. In persons with delicate

FIG. 201.



Papulo-tubercular syphilide.

skin or feeble circulation the color is at first very light red, which changes to a light yellow tinged with brown. On the legs the papules sometimes become of a purple color, owing to blood-stasis or effusion. This condition may be general in broken-down or scorbutic subjects. In rare cases some of the papules on the face are of the color of the normal skin; they are always accompanied by others which are colored. On parts freely

supplied with sebaceous follicles some of the papules are covered by a thin yellowish crust, which, being easily removed, exposes a shining surface with no evidence of ulceration. This crust, formed of epithelium and sebaceous matter, is generally coextensive with the papule.

There is a marked difference in the amount of scaling of the papules in different persons and in different parts of the body. The epithelium at the border of fully-developed papules may be detached and form a fringe around them, as in the case of miliary papules. The scales on the surface of the papules are generally small, adherent, and not of the silvery-white color of those of psoriasis. On surfaces where the epidermis is thick the papules are not infrequently lost in a desquamating patch; this is apt to be the case with late papular syphilides of the palms and soles, which have received the name "syphilitic psoriasis."

These papules are of softer consistence than the small miliary papules, and do not give to the finger the rough, firm sensation of the latter.

In exceptional cases a peculiar necrotic change takes place upon the surface of many of the papules. Their epidermis is thrown off either by scaling or by molecular decay, and is replaced by a dirty-brownish membrane of a fibrous nature, which is removed in fragments or in mass and exposes a granular ulcerated surface. This seems to be a diphtheritic deposit. We have seen but few instances of this complication, and only in cachectic subjects.

Like all other syphilitic papules, these disappear by absorption of their cell-elements. Under the use of mercury the process is rapid; otherwise the papules slowly flatten, and are gradually replaced by copper-colored spots of pigment, which, though quite persistent, are not so obstinate as those left by the small miliary papule. Although internal treatment causes the absorption of the papules, it is almost powerless against the pigmentation left by them.

**THE LARGE FLAT PAPULAR SYPHILIDE.**—The large flat syphilitic papules are either round or oval, and have a diameter of three-eighths to one-half of an inch, and exceptionally of fully one inch. They begin as minute spots, which, as a rule, rapidly increase. Their surface is flat, but occasionally there is a well-marked sloping depression at the centre. They are distinctly elevated, with rounded, sharply-defined edges. A few small adherent scales lie upon the surface, and at the margins of the papules an epidermal fringe or rim may be seen. They generally have a decidedly red color, which soon becomes coppery. In rare cases they are bright crimson red, and exceptionally they have a deep purplish-red tint. They run a chronic course, and cause neither pain nor itching. The surfaces of the papules in rare instances undergo superficial necrosis and become covered with a thin, dirty-looking diphtheroid membrane. Such an occurrence is always indicative of a depressed condition of the system and of a severe form of the disease.

This eruption occurs under a variety of circumstances. In some instances a few papules may be found with an erythematous syphilide or an eruption of small flat papules on the forehead, the neck, and about the genitals. In rare cases this syphilide is the first eruption, and it then resembles the small flat variety in its mode of appearance and its course. It occurs upon the palms and soles with about the same frequency as the

latter, and in these regions it may develop the so-called palmar and plantar psoriasis. When occurring as a first general rash this syphilide shows no tendency to a circular arrangement, and, although the papules may be more closely aggregated on such parts as the face, neck, shoulders, inguinal and gluteal regions, and near joints, they do not coalesce except in parts continuously irritated. Owing to irritation their area sometimes becomes greatly increased.

In general this syphilide belongs to the middle and late periods of the secondary stage, and is with good reason classed by some French authors as an intermediary syphilide. While, therefore, it is rarely observed as the first rash, it is often met with as late as the second and even the third year of syphilis. As a rule, the earlier its appearance the more copious is the eruption. Appearing on the subsidence of a first general rash, it may consist of quite a large number of papules scattered irregularly over the body; such a rash may be composed of less than two hundred papules or even one-third that number. Provided treatment is followed, relapses are composed of even a more limited number of papules, which then show a tendency to appear on the palms and soles, on the face, abdomen, and near joints—seldom, however, in an annular form. About the beginning of the second year, sometimes later, the distribution of this syphilide is even more limited. A few papules appear on the arms or palms, run a chronic course, and are followed by a few on the abdomen, thighs, or forehead. In late eruptions, where the papules are so few, they are often much larger than those of earlier stages, though they rarely exceed a diameter of one inch. In these cases the term “papulotubercle” is perhaps more strictly expressive of the character of the lesion.

When seated on the face and on parts freely supplied with sebaceous follicles, as in the case of the small flat papules, thin, yellowish, non-adherent crusts are sometimes observed on the surfaces of these papules. Not infrequently the margins of some of them become elevated into distinct rims. Again, an annular crust of a dirty-yellow color may occupy the periphery of a papule. Sometimes this rim is so yellow as to give the impression that it is composed of pus, but its removal shows no ulceration beneath, and no pus-cells can be found in it. In these cases there is usually a concomitant symbiotic seborrhœic process. Exceptionally superficial ulceration may occur on some of the papules, which in broken-down subjects are sometimes entirely converted into ulcers. Sometimes, on freely movable parts, superficial or deep fissures may form.

A rare metamorphosis of this syphilide is sometimes seen. The papules become somewhat larger and more elevated. At first their surface is slightly granulated, the appearance suggesting an extraordinary swelling of the *papillæ cutis*. The surface soon looks watery and resembles a raspberry. The prominences are smooth and red, and vary greatly in size, and between them there may be slight ulcerations, from which escapes a secretion which dries and forms a crust. Sometimes, when copious, the secretion has a sickening odor. When thus hypertrophied these papules may be elevated to the extent of two or three lines or more; their surface may be level or markedly rounded. This condition is most prone to occur upon the face, on the scalp, about the shoulders, and near the genitals. When thus changed this syphilide has received the names



“framboesoid,” “vegetating,” and “verrucous.” The extent of the process varies, in some cases being limited to a few papules. This same condition is sometimes observed with the tubercular syphilide. (*Vide infra.*)

A similar feature is sometimes observed on the surface of flat condylomata, and in a more hypertrophic form on some syphilitic tubercles.

Upon surfaces that are in coaptation or covered with moisture, as between the toes, around the navel, at the margin of the nostril, and on the perineum, these papules may become superficially excoriated or transformed into condylomata lata. This is well seen in some cases of papules on the thighs of women. Those on the lower part are simply scaly, those near the genitals are superficially eroded and emit an offensive secretion, while those on the vulva are truly condylomatous.

Under mercurial treatment the papules composing this syphilide are, as a rule, slowly absorbed, a more or less deeply pigmented spot being left. The earlier treatment is begun, the less in degree will be the resulting pigmentation. The later and more scattered eruptions are often more rebellious. They remain indolent, causing more or less desquamation; in which feature, as well as in their color, they sometimes resemble psoriasis.

Not uncommonly in the retrogressive stage of these papules, particularly in late eruptions, absorption of the centre of the lesion occurs, leaving a ring which may be scaly, and which is itself finally absorbed without showing any tendency to centrifugal increase.

When occurring as the first general eruption, this syphilide coexists with the numerous symptoms peculiar to the early period. When of later occurrence it is not infrequently accompanied by pustular eruptions on hairy parts, iritis, alopecia, onychia or perionychia, condylomata, and often by cachexia. When of very late appearance it may be the only manifestation of the disease, and it often recurs in a limited degree, to be finally replaced by lesions of the tertiary period.

**Prognosis.**—The early appearance of this syphilide indicates an active and severe form of syphilis, and calls for prompt and careful treatment, otherwise the supervention of cachexia and of tertiary lesions may be expected. A relapse of the eruption indicates continued activity of the disease. As to the eruption itself, its disappearance is merely a question of time and of treatment.

**Diagnosis.**—A general eruption of this syphilide presents such distinctive features that errors in diagnosis are scarcely possible. Where it occurs in limited numbers and runs a chronic course, particularly when there are several outbursts of papules at short intervals, no other lesions being visible, it may be mistaken for psoriasis. The question may be still further complicated by the appearance of papules upon the elbows and knees. A distinction can, however, generally be made by attention to certain points. In syphilis the papules have a uniform size not seen in psoriasis; in psoriasis the spots are likely to blend and form gyrate patches; while in syphilis they gradually pass away after reaching maturity. The color of the psoriatic patches is pinkish or deep crimson; that of the syphilitic papules is deep brown or dull crimson. It must be confessed, however, that a diagnosis must, in some cases, be established by other features. The scales of the syphilitic papules are not as copious

and usually not as silvery as those of psoriasis; they are simply more or less adherent flakes of epidermis. By scraping a patch of psoriasis much epidermal débris is collected, and there is exposed either a shiny, thin pellicle covering the patch or a granular bleeding surface. Similar treatment of a syphilitic papule gives much less epidermal débris and shows that we are tearing a solid tissue. In the ringed form, from absorption of the centre of the papules the resemblance to psoriasis is sometimes striking, but the scantiness of the scaling, the uniformity in size of the rings, and their stationary condition are in contrast with the abundant scaling, the varying size of the rings, and the tendency to centrifugal growth and fusion seen in psoriasis. The sharply-defined border of syphilitic papules is seldom observed in psoriasis. Moreover, in syphilis there is a history of some other symptom or lesion, or there may be other specific lesions on the body at the time. There may also be cachexia in syphilis, while patients with psoriasis are generally remarkably healthy. The age of the patient is sometimes a point of importance. As a rule, psoriasis begins in early life and only exceptionally after puberty. The syphilide is more common after puberty, on account of the more frequent occurrence of syphilis after that period. Finally, mercurial treatment has no effect upon psoriasis, while it is especially beneficial in this form of syphilide.

**SCALING PAPULAR SYPHILIDE OF THE PALMS AND SOLES (SYPHILITIC PSORIASIS OF THE PALMS AND SOLES).**—Papular syphilides of the palms and soles are often peculiar and difficult of diagnosis. They may occur at any time in the secondary period or may coexist with tertiary lesions; they run a chronic course, unaccompanied by pain and itching, and are generally rebellious to internal treatment.

The erythematous syphilide is often developed on the palms in scattered spots which have a deep-red color, are slightly elevated, and covered by a layer of epidermis. In favorable cases, subjected to treatment, scaling soon occurs, leaving a smooth, rosy, slightly-depressed surface, surrounded by an undermined rim of epidermis. The mode of development of these spots, when not treated, will be described later.

In a general eruption of flat papules a few sometimes occur in the hollow of the palms and soles. They are small, decidedly elevated, and have a deep-red or purple color, which soon becomes obscured by the great increase of epithelial scales. This is well shown in Fig. 202. Exceptionally they are very numerous in the above regions. They disappear under treatment, but if left to themselves they become chronic.

In some cases, usually early in the secondary period and coexisting with dermal or other manifestations, or perhaps being the only evidence of syphilis, a varying number of small, firm, hard, colorless elevations or miniature corns appear on the palms. Usually there are about a dozen on each hand; there may be only two or three or they may be much more plentiful. They cause neither itching nor pain, but are in some instances tender under pressure. They run an indolent course and disappear chiefly by scaling. They are composed of dense masses of epidermal scales which can be dug out with a knife. Usually they are of little importance, but exceptionally they are very persistent, even if active treatment is adopted.

The well-marked scaling syphilides of these parts may appear as early

as the third month of syphilis, at the time of a relapsing eruption, or even at a much later period. They usually begin during or at the decline of an eruption of the flat papular syphilide, but they may be developed independently. In the hollow of the palm or sole a few flat papules of a diameter of one or two lines appear. At first the elementary lesion can be distinctly recognized, being elevated, sharply outlined, and of a deep-

FIG. 202.



Circumscribed scaling papular syphilide of the palm.

red color. If treatment is neglected, they soon become flattened and lose their color and well-defined margins. Meanwhile, other papules may be formed on the borders of the palms, which likewise soon lose their characteristics. They all increase in size, and may form irregular patches by fusion. In severe cases the entire palm and the fingers may be invaded, when we find either a number of small patches or a large one in the hollow of the hand, with smaller ones around it.

These patches constitute the true scaling syphilide of these parts, and are called by most authors "syphilitic psoriasis of the palms and soles" (Fig. 203). By careful examination we find general thickening of the epidermal layer, with much scaling and redness of the surface. The papules are frequently seated in the furrows of the hand, which in severe cases may be converted into superficial fissures or "rhagades." When thus developed this syphilide may persist for months or years, causing annoyance by the desquamation and the feeling of stiffness produced, and giving rise to pain when fissures are formed.

In some cases the disease creeps slowly up the fingers until it reaches the nails, which then become thickened and brittle. In some instances one or more well-marked rings of papules occur on these localities. If,



not cured, these soon coalesce and form a patch which runs the usual course.

As a rule, the affection spreads by the formation of new distinct papules at the border of the original patch. Exceptionally, when a large patch has formed in the hollow of the hand, the disease extends by a crescentic margin a line or more in width, which is distinctly elevated, and, as it invades healthy tissues, the parts left are scaly and subacutely inflamed. In this way the whole palm or sole, with the corresponding surfaces of the fingers or toes, may be involved. Sometimes the lesion progresses in this crescentic manner up the inner side of the foot toward the ankle and around the radial or ulnar borders of the hand, generally

FIG. 203.



The diffuse scaling syphilide of the palm.

not invading the dorsum and not passing the line of the wrist. The lateral surfaces of the fingers may likewise be affected.

Several years are occupied by this process, and as a result we sometimes find general cornification of the dense parts of the epidermis, with thickening of the thinner parts. The dense, hard stratum of epidermis covering the sole, and rather less frequently the palm, often becomes perforated with minute holes, while from it may be dug hard masses of epidermis having a chalky appearance. This affection is called by some "*syphilis cutanea cornea*." All of these forms of epidermal thickening are very often wholly uninfluenced by internal treatment, and always require vigorous local measures.

Chronic syphilis sometimes causes the development of corns or horns on the palms and the soles. Lewin has published an interesting case of horns of the hand which were fully half an inch high.<sup>1</sup>

To the question whether syphilis produces genuine scaling eruptions we must answer that, while they may be scaly and no infiltration of gran-

<sup>1</sup> "*Cornua Cutanea Syphilitica*," *International Atlas of Rare Skin Diseases*, Part 7, 1892.

ulation-cells can be found in their later stages, all syphilitic scaling eruptions begin as a true papular syphilide. Owing to the fact that the integument of the palms and soles is so firmly bound down and is subject to such constant compression and attrition, and also to the fact that the cell-infiltration in these regions is not limited to the vicinity of follicles, the lesion becomes spread out into extensive patches. Probably the specific feature of the process is the deposit of cells which are subsequently absorbed: resulting from this is a low grade of inflammation and a chronic epidermal cell-increase. Therefore, while the papular lesion is characteristic of syphilis, the scaling which follows is in all essentials similar to that of psoriasis. The application of the term "psoriasis" is, however, objectionable. Moreover, the result of treatment shows that the papular affection is influenced by mercury, while the scaling condition is unaffected.

The **diagnosis** of the early papular syphilides of the palms and soles is generally easy, since neither eczema nor psoriasis produces similar appearances. In their early stage the color and situation of the patches indicate their nature, while the history of the case and the coexistence of other syphilitic lesions furnish additional evidence. When the patches are diffuse their resemblance to psoriasis is almost perfect. The latter, however, is often more scaly, is usually more scattered, and is scaly from the first, or begins as rosy-red patches and scaling spots. In many cases of the syphilitic eruption, particularly when it is quite chronic, only one hand will be found to be attacked, and that one will be that most commonly used and subjected to friction.

It is always important to get the patient's idea of the manner in which the affection began. In cases of psoriasis similar conditions have been observed elsewhere on the body. Psoriasis usually begins in early life; the syphilitic affection generally occurs after puberty. It is very rare indeed for psoriasis to appear exclusively in these localities; when seen here it may usually be found elsewhere, especially on the elbows and knees. Some authors mention, as a point of distinction, that the scales of psoriasis are silvery, while those of the papular syphilide are dull and dry. I have seen the scales of the specific affection silvery, resembling asbestos. In many old chronic cases the diagnosis cannot be made from the study of the eruption itself, but only after a careful consideration of its history and of the case in general. Certain chronic palmar eczemas resemble the scaling syphilide. Usually there is more thickening in the former, and there is always much itching. It is more diffuse than the syphilitic affection, and has a tendency to invade contiguous parts.

As a rule, atrophy of the skin does not follow the absorption of the small flat papules, although in very chronic cases minute depressed cicatrices result from absorption of some of the cells of the skin itself as well as those of the papules. This occurrence is more common on the face than elsewhere.

The invasion of this syphilide is usually subacute, but it may be hastened by excessive heat, hot baths, alcoholic drinks, or similar influences. It rarely appears as rapidly as the small miliary papular eruption, and is never accompanied by itching. A period of a week or ten days usually elapses before the eruption is complete. The number of papules varies: when this syphilide is the first manifestation upon the skin, as it is in about 12 per cent. of the cases, the papules are very

numerous, so that the tip of the finger can scarcely be laid upon the skin without touching one or more of them. This may be true also in a first relapse following an erythematous syphilide.

Although the eruption may be less copious, it is usually widely distributed. Relapses are quite amenable to treatment. Uninfluenced by mercurials, this syphilide is very indolent; while some papules are undergoing resolution, new ones appear, so that all stages of development may be represented in a single case. Treatment quickly dispels the eruption and diminishes the copiousness of succeeding lesions. This fact is particularly noticeable in private practice, where patients seek advice early: with careless persons, on the contrary, a relapse may be extensive and profuse.

A relapse of this syphilide may be expected at any time within two years after infection. In one occurring after the sixth month the papules are limited in number and extent, and their color is generally darker than that of an early rash. A few papules may appear over the trunk, upon the face, and on the inner aspect of the limbs near the joints, either scattered or in a ringed form. In relapses of this syphilide the papules tend to appear on the elbows and knees, sometimes in the form of circles or segments of circles, and perhaps accompanied by papules, either scattered or grouped in rings about the shoulders and trunk. Psoriasis presents certain similar features, and is particularly prone to appear in these regions. The syphilide may be found upon the elbows alone; it is rather unusual to see it upon the knees and not upon the elbows. Generally a few papules are scattered over the body.

Careful examination of the patches shows that the rings are formed either by fusion of the papules or by their interrupted distribution. With care it is seen that the basis of the eruption is papular, and that there is no morbid change in the encircled area of skin. This is quite different from the condition in psoriasis, in which a papule increases centrifugally until it reaches a diameter of an inch or more, when evolution takes place at the centre of the lesion, the periphery remaining unchanged.

*Coexisting Symptoms and Lesions.*—When this eruption is the first dermal manifestation, it is usually accompanied by several others, such as buccal and pharyngeal lesions, swelling of ganglia, alopecia, pains of various kinds, and perhaps iritis. The latter affection occurs more frequently with this than with any other form of papular syphilides. Having a marked tendency to relapse at any time during the secondary period, this syphilide may coexist with any of the manifestations peculiar to that period.

*Diagnosis.*—General eruptions of this syphilide are so peculiar in the distribution, shape, and appearance of the papules, and are so often accompanied by other syphilitic symptoms that the diagnosis is usually clear. In some sparse eruptions which are especially chronic, and in which papules are extraordinarily scaly, there may be some doubt between syphilis and psoriasis in its guttate stage. The latter disease is essentially scaly, and the patches are not uniform in size: it generally begins in early life and recurs in subjects apparently healthy; its scales are silvery, imbricated, and plentiful, while those of syphilis are of a more sombre hue, are not imbricated, and usually not very copious. In psoriasis there is a history of numerous similar eruptions: in syphilis



there may be relapses of similar papules, but they are likely to be less copious and more localized with each succeeding outburst. In syphilis there is the history of the initial or other lesion and perhaps the coexistence of other symptoms, and usually a condition of ill-health. Arsenic cures psoriasis, but not syphilis; syphilis is curable by mercury, an agent which is powerless in psoriasis. There is one diagnostic point between syphilis and psoriasis which is very constant. In psoriasis we never find ulceration of the patches, whereas in many cases of syphilis there will be found ulcerated cracks or excoriations in one or more of the lesions, particularly on parts of the skin subjected to pressure or friction.

In those cases in which the papules are developed in a ringed form upon the elbows and knees the general distinctions just given apply. On examination of the rings or segments of rings they are found to be formed by the fusion of individual papules. They are less scaly, more copper-colored, and more sharply defined than the rings of psoriasis, which are formed by absorption of the centre of a circular patch, and which continue to increase in diameter.

### **The Pustular Syphilides.**

These syphilides constitute an important group of eruptions, which, though less common than the erythematous and papular forms, may appear at the earliest stage of syphilis, at any time in its secondary period, or even late in its tertiary period. They vary in severity from a mild and ephemeral eruption to one of the gravest character. The size of the pustules varies from that of a pin's head to that of a ten-cent-piece; they may be acuminate, globular, or flat; they are generally round, but sometimes oval; and they are surrounded by a dull, coppery-red areola. Some have a well-marked papular base, the pustule being a minor part of the lesion; beneath all of them there is more or less infiltration. They may begin as papules or as distinct pustules. They vary greatly in number, sometimes covering the entire body or, on the contrary, being limited to special regions. They show a marked tendency to appear on localities rich in hair- and sebaceous follicles, while certain ones are prone to be developed in particular regions. The pustules may be either scattered or in groups, and are almost always symmetrically placed. Relapses of this syphilide are common; the earlier the eruption the more rapid is its invasion and the more numerous are its lesions, while later eruptions appear slowly, in limited numbers, and with a marked tendency to localization.

Some pustules become encrusted more quickly than others; as a rule, the secretion of the large ones dries sooner than that of the small. In all cases the size and form of the crust correspond to those of the pustule. The crust of the small pustules have a greenish-brown color—those of larger and later ones a greenish-black color, similar to that of an oyster-shell. They are usually of firm consistence and somewhat adherent. Their surface is rough and sometimes distinctly laminated, and may be flat or conical. Their shape may be round, oval, or like a horseshoe. Under small crusts there is usually little, if any, ulceration, and their removal exposes a well-marked papule; under larger ones is an ulcerating surface, more or less deep, of a grayish-red color, covered with a quantity of thick brownish-yellow pus.

The earlier eruptions, being papulo-pustular, usually cause no destruction of the skin, while the late ones, being extensive, deep, and localized, leave cicatrices, which remain pigmented for a long time, but finally become shining white.

Though the visible changes are pustulo-crustaceous, the base of all of these lesions consists of an infiltration of small round granulation-cells similar to that of papules. In the early history of these lesions molecular decay and pus-formation seem to be in proportion to the cell-infiltration, the destruction of tissue very often being limited to the death of the new cells, since perceptible change in the skin itself seldom exists. In other cases the derma melts away with the infiltration, leaving nothing of the original framework.

THE ACNEFORM SYPHILIDE.—This syphilide is thus called because, like *acne vulgaris*, it attacks the hair- and sebaceous follicles, and because it is a papulo-pustular lesion. It consists of conical or slightly-rounded pustules, varying in diameter and elevation from one-third of a line to a line. Sometimes the pustules are as small as a pinhead. The pustules may form the whole eruption, or they may be mingled with miliary papules or the erythematous syphilide.

When appearing at the beginning of the secondary stage as a general eruption, they are usually accompanied by fever, which sometimes reaches the highest point observed in syphilis, and by other symptoms peculiar to that stage. The mode of invasion may be rapid or subacute. In the former case the small red spots rapidly become papular and then pustular, the lesion reaching its full development within twenty-four or forty-eight hours. In such cases the pustules are generally numerous and scattered over the whole body. In the subacute form they appear slowly, and for several days may look like papules, on the apices of which a small quantity of pus slowly forms. The lesions are less numerous, more localized, and more likely to be grouped than in the acute form. The fever in the latter mode of invasion often arises abruptly, and continues at a high grade for several days, when it may fall abruptly or slowly to a point between  $99^{\circ}$  and  $101^{\circ}$  F. In the subacute form it usually rises slowly to  $100^{\circ}$  or  $101^{\circ}$ , and may remain at or about that elevation for several weeks.

The color of the base of the pustules is at first bright red, but, as in the case of miliary papules, it soon becomes dull brownish-red. This change first occurs on the legs and face, and upon the former the pustules are sometimes accompanied by hemorrhagic effusion. The apex of the pustules is at first yellow, but is soon transformed into a greenish-brown, slightly adherent crust. In many cases, particularly of small pustules, the purulent apex is thrown off, leaving a papule, which may be surrounded by the detached rim or collarette already described as a feature of the papular syphilides. Subsequently the papule is absorbed, leaving a small pigmented spot. In cases not treated, and especially in badly-nourished subjects, the pustules become small ulcers. Their base extends, being very hyperæmic, and the crust enlarges with the extending ulceration. It may thus happen that some of the pustules run together, although there is no general tendency to fusion, and they may be distributed in the form of complete or partial rings.

This eruption generally begins about the face, scalp, back of the neck, and shoulders, and may thence invade the trunk and extremities, being

more copious on the scapular, sternal, and gluteal regions and on the outer aspects of the limbs. We frequently find syphilitic papules or erythematous patches on the inner surface of the arms and legs and on the anterior aspect of the trunk. When the pustules are scattered over the entire body, they may be closely crowded together or separated by marked intervals. The first eruptions are always more copious than relapses, in which the pustules appear possibly grouped in patches or in a ringed form about the face, scalp, or shoulders, usually having been preceded by an erythematous or papular syphilide.

This eruption, which generally appears from the third to the sixth month of the secondary period, may run a chronic course, occupying several months in the development and complete disappearance of the lesions. Having run its course, it usually does not recur in its original form, but in the form of larger and deeper pustules or tubercles.

Commonly the skin is not destroyed, the pustules merely leaving small brown spots, which disappear in a few months. The hair of the scalp falls from the affected follicles, but is usually replaced; exceptionally the follicle is destroyed and a minute cicatrix results.

The **prognosis** of this syphilide is not so good as that of other earlier forms. The eruption itself is troublesome, and the general health is rather more frequently impaired after this rash than after others.

The concomitant **symptoms** vary with the date at which the eruption appears. If it is the first rash, it is of course accompanied by symptoms and lesions peculiar to the period of invasion; at a later period it may coexist with alopecia, onychia, mucous patches, iritis, neuralgia, nervous symptoms, and perhaps lesions of the bones and testes.

**Diagnosis.**—The history of the case, the usual presence of other lesions, and the appearance of a generally distributed pustular syphilide preclude the possibility of mistake. Acne vulgaris resembles it in certain particulars. Acne, however, generally begins about puberty, and is confined to the face and back, and rarely attacks the hair of the scalp. It is never attended by systemic reaction. Moreover, it presents papules, pustules, and comedones, which have no uniformity of size; some are indeed miniature furuncles, and all have at some time a more or less hyperæmic areola. The pustules retain their character indefinitely, and on pressure pus exudes from a cavity, whereas in the syphilitic lesion the pus surmounts a papular base. Acne attacks exclusively the upper parts of the body; syphilis may be general.

In its papular stage the pustular syphilide, when grouped, may resemble lichen, the distinguishing points of which have been given in describing the miliary papules.

Some French writers have called this eruption a “vesicular syphilide,” since the purulent contents of the pustules are occasionally so thin as to resemble serum. About the face, and especially the chin, a few well-marked vesicles may, in rare cases, be seen. They are very minute, may be grouped in a ringed form, and they either become pustular or they flatten, scale, and become pigment-spots. Usually pus is present from the first.

In exceptional cases pustules are found on the sides of the thorax along the line of the ribs, presenting some resemblance to herpes zoster. They are always symmetrical, whereas herpes is rarely so. The syphilitic

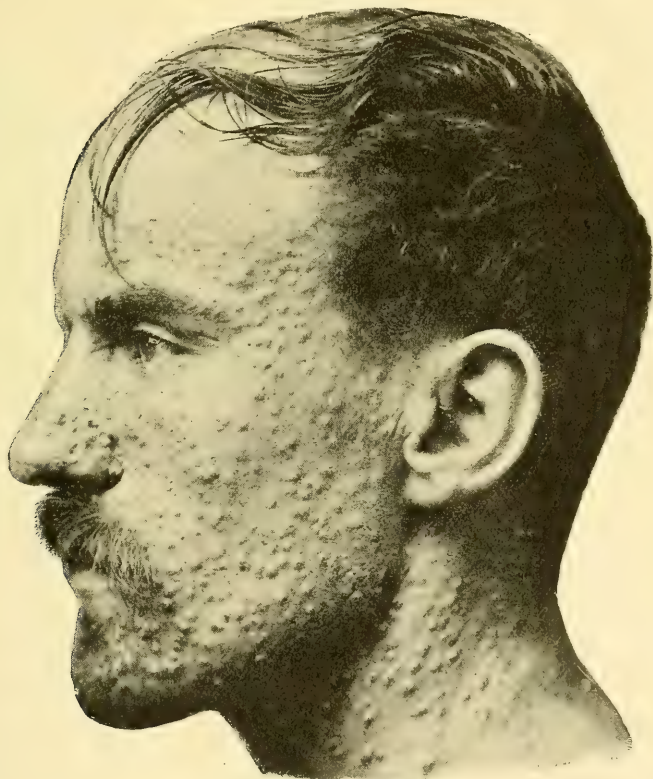


lesions are not preceded or followed by pain, as is the case in herpes. In the latter affection, moreover, the lesions are generally limited to the intercostal spaces, and, if found elsewhere, follow the course of some nerve, whereas in syphilis the localities are quite definite and other specific lesions may coexist.

**THE VARIOLAFORM SYPHILIDE**—This eruption is much less common than the acneform variety, and is interesting chiefly in its resemblance to varicella and variola. It is rarely the first eruption of syphilis, but appears after any of the early rashes.

It consists of round superficial pustules, the epidermis covering the pus being rather thin. It begins in the form of red spots, which within a day or two become pustules with a diameter and an elevation of one or two lines. (See Fig. 204.) These pustules are surrounded by a limited,

FIG. 204.



The variolaform syphilide.

deep-red areola, and there is evidently not very much thickening at their bases. When fully developed they flatten slightly at the centre, some presenting marked umbilication. The epithelial cover of the pustules slowly shrinks, becomes darker, and finally, in a few weeks or sooner, deep greenish-brown crusts, about half a line in thickness, are formed, which adhere somewhat closely to a slightly exulcerated base. In general

the pustules run an indolent course and do not increase much in size, but in aggravated cases they become very large and may run together. They may be disseminated over the body or grouped in particular regions, and they sometimes form circles and parts of circles.

These pustules have no tendency to a follicular origin, but are found on parts where the skin is soft and delicate, frequently, like other syphilides, upon the forehead and at the line of junction of skin with mucous membrane. They are generally sparse on the outer aspect of the extremities, more numerous on the anterior of the trunk, and often abundant near the genitals and in the inguinal region. In rare cases they are found on the palms, and still more seldom on the soles; I have seen but one instance of the latter, and very few cases have been reported.

On account of the large size of the pustules this syphilide has been called by some French writers "*pemphigus syphiliticus*," and, owing to its occasional development upon the palms, it has been claimed that pemphigus may occur here in acquired as well as in hereditary syphilis. The large pustules which may form in these regions in acquired syphilis are not, however, pemphigoid bullæ. The thickness and firm attachment of the skin of these parts prevent elevation of the epidermis to a great degree; hence the pustules spread out and run together, thus coming to resemble bullæ. While admitting the rare occurrence of pemphigus in acquired syphilis, I do not believe that it is developed upon the palms and soles.

The mode of invasion of this eruption is generally rather slow, and is seldom accompanied by very pronounced febrile movement. It begins about the face, and thence spreads slowly over the body in the course of one or two weeks. The crusts, which form when the pustules reach their height, fall off, leaving pigmented spots. Sometimes new crops rapidly succeed old ones, so that an eruption may last several months. The eruption is greatly influenced by treatment; although its full arrest is difficult, future outbursts may be prevented.

Where untreated and in poorly-nourished, weakly subjects this syphilide ulcerates deeply and induces a condition of marasmus. Under such circumstances, when the eruption seems to assume a malignant type and is accompanied by cachexia, we have an illustration of a somewhat rare form of syphilis called by the French "*precocious malignant syphilis*" (*syphilis maligne précoce*) or "*galloping syphilis*" (*syphilis gallopan**te*). Any form of pustular syphilide may assume these characters.

A very limited eruption of this syphilide sometimes occurs on the face or body or symmetrically on the arms. Such a rash runs a slow course, usually without much fever, and generally occurs in cases where treatment has been stopped too early.

This eruption rarely appears earlier than the third month, and may be seen as late as the second year, of syphilis. With it may be found lesions peculiar to this period, and frequently a sparse papular eruption, mucous patches, or condylomata lata.

The diagnosis of this syphilide is generally easy. Prodromal symptoms observed in small-pox and varicella, such as backache and eruptive fever, are noticeably absent, and there is much less general disturbance. In the acute eruptions there are great heat and tension of the skin, and at the outset small shot-like papules may be felt, which rapidly pustulate. More or less diffuse patches of hyperæmia, accompanied by sensations of

itching and burning of the skin, are sometimes present. Variola progresses so rapidly that its character is perfectly clear after the second day. The slow development of the syphilitic eruption and the absence of subjective symptoms are distinctive points in the diagnosis.

THE IMPETIGOFORM SYPHILIDE.—This syphilide, like the preceding, is a pustulo-crustaceous eruption, and attacks the more superficial layers of the skin, differing from it, however, in the fact that the lesions are not so distinctly circumscribed, but have a tendency to involve a much greater surface and often to assume a serpiginous character.

The resemblance of this eruption to simple impetigo is in the grouping of the pustules, in their fusion, and chiefly in the somewhat similar appearance of the crusts. The pustules of the specific eruption are usually much larger and flatter than those of the simple form, and their resemblance is hardly so close as to warrant the term "impetigoform" applied to them. They dry so quickly into crusts that the pustular stage is soon lost.

This syphilide almost never occurs as the first exanthem, but rather during a late relapse, its earliest appearance being at the decline of the initial rash, and its usual time of evolution being about the middle or latter part of the first year of syphilis. In cases not treated it may occur during the second or even the third year. Most of the pustules have a perifollicular origin, and are found on hairy parts, rarely on the hands and feet. When this syphilide occurs early the pustules are rather discretely distributed over the whole body; when it appears later they are distinctly localized and grouped.

The pustules begin as circumscribed red spots which rapidly become elevated by yellow pus seated beneath the epidermis. These spots, few of which are papular, are sometimes small and round, and again are very large and irregularly oval. After the effusion of pus each patch becomes covered by a dark-brown adherent crust. The crusts of several pustules may run together, their mode of formation being indicated by incomplete lines of separation. Their surfaces are usually flat, their edges rounded and in relation with the margin of the ulcer, and they are surrounded by a narrow, dull-red areola.

Upon the face, at the margin of the hairy scalp, in the scalp itself, about the *alæ nasi* and commissures of the lips, upon the chin, and in the beard these crustaceous pustules run together and form patches, usually not more than two inches in diameter. In the hairy parts the outline of the incrustation is generally not at all regular. Only in late eruptions do the pustules unite and form large patches. On the trunk a few may be seen over the sternum and in the hypogastric, inguinal, and gluteal regions. On the anterior aspect of the forearms, and more rarely of the thighs, some may also be found, and here they are likely to be grouped and to increase rapidly in size, a pustule sometimes reaching a diameter of an inch or more within two weeks. The pustules usually retain their circular form as they increase in size, but sometimes they become kidney-shaped: this peculiarity is noticed rarely on the face, but more commonly on the forearm.

In some untreated and broken-down cases these pustulo-crustaceous lesions take a serpiginous course, invading the superficial layers of the derma, generally of the upper extremities. They progress by a ring of



ulceration, covered by a crust and enclosing an area of skin already healed. This ring of ulceration is prone to extend in a circular form on the face and in an oval form on the arms. When the patch is a few inches in diameter the aspect of the original lesion is wholly lost. We then find a distinctly raised ring, one to three lines in breadth, of a yellowish-brown or black color, which encloses a round spot of slightly hyperæmic skin. The ring gradually extends until the whole forearm and part of the arm, the greater part of the face, or the entire sternal region may be invaded. Even in the worst cases surprisingly little alteration of the skin follows this process, and in many no change whatever is apparent.

Besides this superficial form of the serpiginous syphilide, there is a similar lesion which attacks the tissues more deeply and induces destruction and cicatrization of the skin. This latter eruption I shall call the *serpiginous tubercular syphilide*. The *superficial serpiginous* syphilide may also begin as a variolaform pustule, and may persist many months or even years. While it usually attacks large areas superficially, it may also attack deeper portions of the skin. In the latter case the areolæ of the pustular ulcers become thickened and more red, and the crust becomes more elevated and uneven. Underneath the crust ulceration progresses, and, instead of the superficial grayish-red ulcer usually found, there is a deep and sharply cut excavation, with a red, uneven surface freely covered with secretion.

The ulcerations vary in size: in neglected cases we have seen them large and deep on the scalp and in the beard, and more superficial upon the forehead. In some cases the alæ of the nose may be lost. The destruction of tissue is generally greater about the face and head than elsewhere. Severe cachexia may occur coincidently with this eruption, and other serious lesions may follow, until we have an instance of malignant precocious syphilis which is attended by much suffering and may even imperil the patient's life. Usually, however, now that syphilis receives early and careful treatment, this eruption does not assume these destructive features; healing takes place under the crusts, which are then thrown off, leaving a smooth, deep-red surface, which may be slightly scaly and deeply pigmented for several months. On raising the crust from a fully-developed patch on the arm we usually find a smooth, reddish-gray ulcer without undermined edges; on the face, however, the surface is likely to be uneven and frequently covered by little papillomatous elevations, over which the crusts are accurately fitted. This warty appearance, which is often seen on hairy parts, is the result of an increased cell-infiltration into the papillæ cutis around follicular openings. These uneven surfaces gradually become flat and lose their color.

The *course* of this eruption is usually very chronic. On its invasion the pustules may be very numerous, or a few only may first appear on the head. Thus for long periods new pustules may appear as old ones fade. In other cases a general, extensive rash may run its full course in a comparatively short time.

Coexisting lesions are those peculiar to the period at which the eruption appears. Rarely being an early eruption, we seldom find it coincide with the erythematous syphilide, except during a relapse of that lesion. It is not uncommonly found in a sparse and limited form with, or at the

decline of, one of the papular syphilides. *Condylomata lata* are frequently present on regions which this eruption attacks, and very often it is continuous at the angle of the mouth with a mucous patch of the lip or cheek. Since it may occur at any time in the secondary or tertiary period of syphilis, any of the intermediary and many of the late manifestations of this disease may be present with it.

This syphilide most commonly attacks persons in a debilitated condition, those who have some organic disease or who have neglected early treatment. The **prognosis** must, therefore, be based upon the patient's general condition as well as upon the eruption itself. The presence of the eruption, however slight, is an indication for careful and continued treatment and for attention to the patient's nutrition and hygiene.

This eruption may be mistaken for small-pox, but its invasion is less severe and rapid, and the development of the pustules is much slower.

This syphilide may be mistaken for impetigo in its disseminated and in its confluent form. The lesions of impetigo retain their pustular character much longer than do those of syphilis. They are attended by heat and itching of the skin, and have an inflammatory areola; they are much more uniform in size than are the pustules of syphilis, and their crusts are of a greenish-yellow color instead of the greenish-black of syphilis. The acuteness of invasion in the case of large patches of the simple eruption is in striking contrast with the slow, painless, and indolent character of the syphilide. These features, considered in connection with the history of the case, make the diagnosis clear.

**THE ECTHYMAFORM SYPHILIDE.**—There are two varieties of this syphilide, superficial and deep. The superficial is the earlier eruption, appearing at any time during the first year of syphilis, and is usually composed of a greater number of pustules. The latter resembles those of non-specific ecthyma in having a solid, elevated base surrounded by a crust, and in their tendency to ulcerate. The deep form may be an intermediary lesion, or even a rather late one. The pustules of the superficial form vary in diameter from one to three lines. They begin as slight red elevations of the skin, which in a day or two become small, conical pustules. The pustules gradually increase in size, and crusts are formed by desiccation of the pus. The crusts grow in proportion to the bases of the pustules, and their yellow color soon becomes brown, which is rendered still darker by particles of dirt and sometimes by admixture of a little blood. When fully formed their color is yellowish-brown and their shape round or conical. As the pustules increase in size the crusts become flattened and even depressed at the centre. The base is at first of a bright-red color, which soon becomes a dull reddish-brown, and it is surrounded by an abruptly limited areola. Beneath the crust, which is seldom firmly adherent, is an ulceration, involving the superficial layers of the derma, and having a smooth floor covered by a grayish-red film of molecular detritus bathed in thick pus. After commencing treatment and with improvement in the general health the base becomes less dark and contracts; the areola fades; the crust becomes hard, dry, and very adherent, and, if removed, a smooth red surface is seen, sometimes slightly papillated. This surface may be again covered by a thin crust made up chiefly of epidermis, which in turn falls off, leaving a smooth, reddish-brown patch or a slightly elevated, papular, and scaly surface.

Under unfavorable circumstances the areola and the base are redder and more extended, pus is secreted in greater quantity, the ulcer increases in depth and extent, in extreme cases reaching a diameter of one or two inches, and perhaps several ulcers may unite. In such cases the syphilis assumes a malignant form, and there is much systemic prostration.

The **course** of such an ulcer is similar to that of the impetigoform syphilide when the latter becomes serpiginous.

The superficial ecthymaform syphilide begins by the development of pustules either in a disseminated or an aggravated form, about the scalp, particularly at its junction with the face and neck. They may appear gradually and without much febrile movement, or in a manner quite the reverse. Soon after other portions of the body, such as the anterior surfaces of the legs and forearms, the trunk, particularly on the posterior surface, and the inguinal and gluteal regions, may be invaded. (See Plate VI.) In some cases this is accomplished in a week or ten days; in others small crops of pustules succeed each other at short intervals, and fully a month may be occupied in the complete development of the eruption. When this eruption occurs early, especially in cases inefficiently treated, the lesions are apt to be extensive and copious; occurring later, it may be limited to one region, and may even be unsymmetrical. The pustules may be isolated or grouped in patches or in the form of circles or parts of circles. They may or may not leave cicatrices.

The deep variety of the ecthymaform syphilide is usually a rather late lesion, but it is sometimes precocious. In the latter case it may be very malignant, and it is then the expression of profound syphilitic cachexia, thus constituting another instance of the "galloping syphilis" of the French. This syphilide begins as a papulo-tubercle. A round or oval elevation appears, upon which a quantity of yellow pus soon forms, and this becomes thicker and dries into a crust of a brownish-black color, owing to the effusion of a little blood. When fully formed we find an incrustated papulo-tubercle, with a diameter of one-quarter to one-half of an inch. The firm, deeply-seated base has a dark, coppery-red color and is surrounded by an areola of a similar hue. The crust is generally rounded or conical, but may flatten out as it extends. (See Fig. 205.) A deep, punched-out ulcer, with sharply-cut edges and a smooth, grayish-red surface, covered with a foul, rust-colored pus, underlies the crust, which can be removed with little force. In some cases the crust fully covers the ulcer; in others it is smaller and is surrounded by a ring of ulceration. If untreated, the ulcer continues to increase, and may become serpiginous, invading extensive surfaces. Several ulcers may merge together. Influenced by treatment, the areola fades, the base contracts and becomes slightly wrinkled, and a granulating surface is found beneath the crust, which becomes hard and adherent. In some cases, as a result of stimulation, a layer of epidermis soon covers the surface of the ulcer, but often profuse granulations spring up, and may even rise above the level of the surrounding skin. After healing of the ulcer there remains a coppery-red spot, which gradually fades, and finally leaves a shining white cicatrix, which is for a long time fringed by a narrow copper-colored areola.

This eruption is generally most abundant on the antero-exterior surfaces of the legs; often these pustules may form on the corresponding



PLATE VI.



THE SUPERFICIAL ECTHYMA-FORM SYPHILIDE.



surfaces of the arms or about the face and on the lower portions of the trunk. It is usually developed slowly, appearing in crops of from two to twelve at intervals of one or several weeks. It may be accompanied by cachexia, and not infrequently by fever of a remittent type. The course of the eruption is very slow and insidious, often extending over many months or even more than a year. In many cases there is no true cachexia, but simply extreme prostration. In such cases the ulcers are not numerous, and show only a slight tendency to spread.

FIG. 205.



The deep ecthymaform syphilide.

The **prognosis** of this syphilide is variable. In the superficial form the eruption often gives much annoyance, yet it may disappear without leaving scars. The condition of the system is always below par, and the prognosis should be governed in great measure by the degree of improvement under treatment. In most cases a favorable result may be expected in the course of a few months, but in rare cases prolonged cachexia follows.

The prognosis of mild and limited cases of the deep variety is usually good. In more extensive and relapsing cases the outlook is less favorable; the presence of the eruption indicates a depraved condition of health, which is greatly aggravated by the irritation and drain of the deep ulcerations. A few months of proper treatment will, however, generally effect a cure.

The **diagnosis** of this syphilide is almost always quite easy, although it may be mistaken for ecthyma. The superficial form is to be distinguished from a similar ecthyma by the peculiar course, situation, and appearance of the syphilitic pustules as compared with the more inflammatory, pruritic pustules of ecthyma, which are more uniform in size,



have yellowish-brown crusts, and much less tendency to ulceration. Moreover, ecthyma usually occurs on the legs of broken-down subjects, and is an eruption of papules and pustules, the latter forming only superficial ulcers. In some cases of phtheiriasis in uncleanly and unhealthy persons pustulo-crustaceous ulcers, somewhat resembling those of syphilis, are seen, but with care a diagnosis can always be made. The discovery of the pediculus vestimentorum, the presence of minute blood-crusts caused by the bite of the insect, and very often scratch-marks, and a general papular and pruritic condition, establish the diagnosis of phtheiriasis.

The deep ecthymaform syphilide might perhaps be mistaken for *ecthyma cachectica livida*, since the latter occurs in much debilitated subjects. The histories of the cases and a comparison of the lesions render the distinction clear. The lesions of syphilis are less inflammatory than those of the non-specific eruption; they involve much less of the surface, but extend much deeper and they secrete much less pus. Moreover, the areola of the simple lesion is either bright red or deep purple, and is much more extensive than that of the syphilitic pustule.

### Malignant Precocious Syphilides.

Under this title French authors have described certain syphilitic eruptions which have a malignant ulcerative character, appear early in syphilis, and are accompanied by general cachexia. These eruptions vary greatly in extent and duration. In some cases the malignant tendency is exhibited from the first, while in others it attacks a previously mild eruption. It has already been stated that certain pustular eruptions, particularly the impetigoform and the ecthymaform syphilides, and much less frequently the papular rashes, develop this character. In some instances this peculiar feature of the eruption is due merely to the excessively debilitating influence of the syphilitic poison or to a lowered condition of nutrition. Dr. Ory, who has studied the etiology of the malignant syphilides, concludes that alcoholism is a very potent cause, but that any adynamic influence may have the same effect.

These syphilides are divided into three classes: *the syphilide puro-crustacée ulcéreuse*, *the syphilide tuberculo-crustacée ulcéreuse*, and *the syphilide tuberculo-ulcérente gangréneuse*.

The syphilide *puro-crustacée ulcéreuse* is a pustular rash attended with extensive ulceration and formation of scabs. It begins as rounded pustules, grouped or irregularly scattered, which soon ulcerate and form flat or conical greenish-black crusts which may blend together. The ulcers are deep, with sharply-cut, undermined edges and a foul base secreting a fetid pus. Such an eruption appears first upon the face or scalp, where the lesions are often in groups; then it invades the arms, and may even extend over the entire body, successive crops of pustules being developed in bad cases. There is rarely a tendency to ringed distribution, but sometimes one group of pustules is increased by the formation at its periphery of new pustules.

The syphilide *tuberculo-crustacée ulcéreuse* begins as a small red tubercle of the size of a pea, which is rapidly converted into an ulcer with a thick crust. The subsequent course is similar to that of the

previous variety, except that the destruction of tissue is often much greater. This eruption is prone to appear first on the head and upper extremities. In some cases these regions only are attacked; in others the whole body is invaded. Upon the face the ulcers are often confluent; upon the arms they are usually scattered, but later on groups may be formed by the continual accession of new tubercles. The invasion of this eruption, like that of the preceding one, may be rapid or slow. Its course is chronic, sometimes occupying six or eight months or even a year. During ulceration the lesions sometimes cause a dull pain, and are at all times a source of much discomfort.

The syphilide *tuberculo-ulcérante gangréneuse*, one of the most formidable manifestations of syphilis, is happily rare. It is always accompanied by cachexia, and if not fatal always leaves a condition of permanent ill-health. It begins as round tubercles of a dark-red color, slightly elevated and deeply seated in the skin, which attain a diameter of an inch or more. A small blackish slough forms in the centre of each tubercle, and is at first firmly adherent; it extends rapidly, and, soon becoming loosened by the secretions, is cast off as a fetid, cup-shaped mass, looking something like an inverted rupia crust. The ulcer thus exposed is very deep, has a foul, dark-brown surface with hard, everted edges, and secretes a fetid ichor. To the touch it gives the impression of being deeply seated and indurated like a typical initial lesion or chancre. Surrounding each tubercle is a broad, deep-red areola. Phagedena may occur and run a course similar to that of phagedenic gummous ulcers. From time to time brownish-green crusts form and are thrown off. In favorable cases the surface of the ulcer gradually assumes a more healthy appearance, the edges become softer, and the areola fades. Granulations appear, and true pus replaces the ichorous discharge. The healing process is finally completed, leaving a depressed cicatrix of a coppery-red color, which gradually fades from the centre toward the periphery of the cicatrix. When fully formed the cicatrix is of a dead-white color, flexible, and thin like parchment.

The invasion of this syphilide is generally rapid, but its subsequent course is slow. Usually tubercles are developed in region after region, followed perhaps by additional crops. They are irregularly scattered, with no tendency to a ringed form. The face, the extremities, the shoulders, and buttocks are its favorite seats. The eruption may persist for several months, or even years, although in the most malignant cases it runs a course called by French authors "*galloping*." In such cases the invasion is very rapid and the result is generally fatal.

At or shortly before the appearance of these precocious syphilides the patients complain of weakness, and appear pale and sallow. They often suffer from fugitive pains and neuralgias and from a general sense of discomfort. They have no appetite and become emaciated. At the same time some febrile reaction may be noticed. If not checked, this adynamic condition increases *pari passu* with the eruption; the patient falls into a typhoid state and dies. Possibly some intercurrent visceral lesion of the lungs or of the nervous system hastens the fatal result. In some cases no definite visceral affection can be detected, and the patient dies of marasmus. Very often lesions peculiar to a later period, such as nodes, necroses, sarcocoele, etc., appear with this malign eruption.

In other cases, although the syphilide is essentially malignant, health gradually returns after a prolonged period of impaired nutrition and extreme debility.

The **prognosis** of these syphilides is always grave, since they indicate a most intense and active form of syphilis. The health of the patient previous to infection, his habits, the extent and character of the eruption, and the degree of cachexia must all be considered. The course of the lesions and the influence of treatment must be watched. Death almost always results from the intercurrent of some pulmonary or nervous affection.

As regards **treatment**, every effort should be made to improve nutrition. Much can be done toward checking the course of the eruption by the employment of local measures. Careful dressing of the ulcers, their thorough disinfection, and the early removal of secretions not only add to the comfort of the patient, but promote healing. In spite of every precaution; indelible cicatrices are generally left. Internal treatment must also be employed. The guarded use of mercury, preferably by inunction, with iodide of potassium, sodium, or ammonium internally, is indicated. Opium is often found particularly useful in these cases by calming the restlessness of the patient and quieting the pain of the ulcers. In a recent case of my own, in which the malignant syphilide was accompanied by profound cachexia, by severe and persistent rheumatoid pains, and by double iritis, this deplorable condition was in less than a week markedly improved by the addition of a little opium to the mixed treatment, combined with tonics. We may sometimes resort to mercurial vapor baths with iodide of potassium or sodium, combined with bitter tonics, internally, beginning with ten- to fifteen-grain doses three or four times a day, and gradually increased by two or three grains daily. Mercury given in this way is supposed to have a beneficial local as well as general effect. The condition of the stomach demands that the most digestible and nutritious food be taken, if possible, in small quantity and at frequent intervals. Stimulants, preferably good port wine or brandy, must be given regularly. Such treatment as the above is suitable when the patient is still able to move about. In a typhoid condition treatment applicable to the adynamic fever is called for, together with the careful use of the iodides. The crusts of the ulcers should be removed after softening them with simple ointment or cosmoline to which a few drops of carbolic acid have been added. When they cover the whole body an alkaline bath may be required for this purpose. The exposed surface of the ulcers should be touched with carbolic acid, applied with cotton-wool or a brush. Its action is twofold: it allays pain and destroys the diseased tissue. The formation of scabs may be prevented by the application of an ointment or the water dressing. An ointment composed of one part of mercurial ointment, one part of balsam of Peru, and six parts of vaseline, applied on lint and frequently renewed, is of great service. Simple lead-water or a solution of the bichloride of mercury, 1:2000 or even weaker, is to be preferred when there is much hyperæmia. The latter has a special detergent and stimulating effect. As the case progresses such a superficially destructive stimulant as nitrate of silver in strong solution or fluid carbolic acid may be indicated. The ulceration is sometimes arrested and repair hastened by prolonged immersion of the body in hot water. These



hot baths may be rendered more efficacious by the addition of two or three drachms of corrosive sublimate to each thirty gallons of water. Care must be exercised as regards their frequency and duration. The mercurial vapor bath is often of benefit after removal of all the crusts, but its effect must be carefully watched.

By way of **prophylaxis**, when the eruption shows a tendency to extend all possible sources of irritation of the skin must be removed.

### The Pigmentary Syphilide.

The history of the pigmentary syphilide is a most peculiar one and worthy of consideration. It is an affection which at first was clearly and sharply described, but which in the course of time has been rendered so obscure that to-day very few have clear and precise ideas as to its course and its nature. In the whole range of syphilography there is not a like instance in which the knowledge of a manifestation of syphilis has become so progressively obscure, and in which so much confusion has been interjected by reason of the successive additions to its literature by many writers. In the sixties we knew what the pigmentary syphilide was as a result of the writings of Hardy, Fournier, Pilon, and Tantarri. To-day this well-marked and peculiarly characteristic affection is so little understood that it is confounded with the pigmentations and the leucodermatous conditions left as a result of previous syphilitic processes. The writings of a number of Continental authors have had much to do with the obscuration of this question, for these authors regard any pigmentation or leucodermatous condition primary or secondary to a previous syphilitic process as examples of the pigmentary syphilide.

We cannot too strongly insist upon the necessity of holding fast to the postulate that the pigmentary syphilide is a unique, well-marked affection, having a sharply defined pathological basis and a course attended by well-demonstrated morphological changes. As a corollary of this, I may add that secondary pigmentations and leucodermatous conditions occurring in the course of syphilis, as relics or sequelæ of lesions chiefly secondary, are in no sense examples of the pigmentary syphilide; they are simply dischromatous accidents and not sharply-defined essential affections.

The reasons why this confusion has been produced are many, and the chief ones are the following:

1. Many of the writers have had little experience in the study of syphilis, and have written in a dogmatic manner from the observation (and that usually very limited as to time) of one or perhaps two cases.

2. Conclusions have been drawn from clinical appearances presented at various stages in the progress of the affection, which, being of long duration and presenting at different periods varying pictures, cannot be well understood by any one unless he has had his case or cases under his observation during the whole period of development, evolution, and involution of the affection.

3. With one exception (Maieff) authors have studied the question from a histo-pathological basis in a haphazard way, but have been none the less dogmatic in their conclusions. Thus no observer until Maieff's time studied the disease microscopically, step by step, in accordance with its

natural evolution. On the contrary, sections of skin were made indiscriminately in cases of secondary pigmentations and leucodermatous conditions, and perhaps in cases of the true pigmentary syphilide. In no instance is any distinction observed. In this way discrepancies have been produced and flat contradictions and anomalies have resulted.

4. Every pigmentation in a syphilitic, recent or old, is called the pigmentary syphilide, and the latter is thus deprived of its essential character.

The primordial pigmentary anomalies due to syphilis consist essentially in a superpigmentation, which may in whole or in part be replaced by a corresponding loss of color or leucodermatous condition. This primordial hyperpigmentation is the essential pigmentary syphilide; all other discolorations are secondary processes and in no manner entitled to be classed as pigmentary syphilide.

The pigmentary syphilide is seen in three well-marked and quite distinct conditions :

1. In the form of spots or patches of various sizes.

2. As a diffuse pigmentation of greater or less intensity, which sooner or later becomes the seat of leucodermatous changes in the shape of small spots which gradually increase in size. This is the retiform pigmentary syphilide—the *syphilide pigmentaire à dentelles* of Fournier.

3. In an abnormal distribution of the pigment of the skin, in which, owing to the lack of or crowding out of the pigment in places, they become whiter, while the parts involved in the abnormal distribution become darker; in this way a dappled appearance is presented. In this form there is probably no excess of pigment; it is seemingly unequally distributed throughout the tissue-expanse. This form has been termed the marmoraceous, from its resemblance to some forms of marble in which there is an intimate interblending of light and darker colors. This marmoraceous pigmentary syphilide is not common, and it is peculiarly liable, by reason of its delicacy of tone and tint, to pass unobserved.

All forms of the pigmentary syphilide appear both early and late in the secondary period, and they may be the only evidence of the diathesis or they may coexist with other manifestations. The evolution of this syphilide may occur as early as the second or third month, but it usually appears about the sixth month or toward the close of the first year, or it may develop during the second or third year of infection. It occurs most commonly in females, particularly blondes, up to the age of thirty or thirty-five years. It is rarely found in the male sex.

The parts of predilection of the syphilide are the lateral surfaces of the neck, less frequently the face, and then more commonly the forehead. It may be seen on the trunk, arms, and legs, and may, very exceptionally, slowly invade the whole body. It is unattended by any subjective symptoms whatever. The pigmentary syphilide is peculiar in the fact that it is wholly uninfluenced by internal treatment, and external applications have little if any effect upon it.

The pigmentary syphilide in the form of spots or patches consists of round, oval, or irregular plaques, which may have sharply defined borders or their margins may be dentated or jagged. Their color varies from a light-brown *café-au-lait* to even a quite deep-brown tint. They are unaffected by pressure and the condition of the circulation. In persons





PLATE VII.



Retiform Pigmentary Syphilide.

of light and delicate skin they may be very faint in tint and perhaps only perceptible in oblique light.

In this form of pigmentary syphilide it is common to see the uneven distribution of the pigmentation; sometimes the color is deeper at the margin. Commonly there is no involvement of the intervening skin, though sometimes the hyperchromatous condition produces the illusion that the unaffected skin is whiter than normal. These pigmented spots may remain unchanged and indolent for months, particularly in cold weather. In the course of time they show evidence of fading, and they slowly disappear. The process of involution may begin at the margin and extend centripetally, or it may take place in the whole morbid area. In some cases colorless patches are left after the disappearance of the pigmentation; there is then produced a secondary or pseudo-leucoderma. Now, if a case is seen only in this stage, I can well understand an observer reaching the conclusion that the process was an atrophic one; consequently, it is easy to see why so much is written upon syphilitic leucoderma and syphilitic vitiligo. These expressions clearly show the want of a full knowledge of the disease, and that the observer has only acquainted himself with its stage of decline. In most cases the skin retains its normal appearance after the full involution of this syphilide.

The second form of pigmentary syphilide (see Plate VII.)—the lace or retiform variety—is far more common than the previous form. More or less slowly, and even rapidly, the sides of the neck become discolored, the tint being that of *café-au-lait*, or even of decided yellowish-brown. The most common site of this eruption is on the sides of the neck and perhaps on the back of the neck. The patients usually say that they noticed or were told that their necks were getting or had got dirty. Intelligent and observant patients will very often distinctly state that their trouble began with a browning of the skin, and they will state positively that there was no intermingling of white spots. From the neck this eruption may extend more or less extensively over the trunk, mostly anteriorly or down the arms. I have never seen it go up on the face. In many cases this eruption passes unnoticed, and may be attributed to the action of the sun, to irritation, or even to uncleanness. When the pigmented patch has involved more or less of the sides of the neck, a peculiar change will be observed in it—namely, the development of whitish spots which may be taken for leucoderma. Scattered irregularly over the pigmented surface close observation will show a few or many minute white specks, which in a short time, particularly in hot weather, will be large enough to present definite shapes, which may be round, oval, linear, or irregular. These white spots gradually grow, and in many instances the neck is largely covered with them before the patient knows of any change having taken place. They then say or are told that their necks are growing white. Undoubtedly, many a doctor, upon this information being given him, has concluded that he has a case of leucoderma before him. Sometimes the white patches are distinctly lighter than the normal skin; in other instances the contrast between dark and light is illusory, and there is really no difference in color between the so-called leucodermatous patches and the unaffected skin. The white spots may or may not be sharply margined, in some cases the line of margination being clear and sharp and in others indistinct. I have never seen the thin, filmy, superpig-

mented area around white patches of true pigmentary syphilide which we see so clearly and so commonly at the circumference of patches of leucoderma or vitiligo, as it is called. This point, in my judgment, is of diagnostic import, and is explained by the pathology of the disease, to be considered farther on. The tendency of the white spots to extend necessarily means the diminution of the brown background. In this way we have various pictures presented, and a dappled appearance is produced, which warrants the name for this eruption at this time of the *dappled syphilide*. Toward the final stage of the disease the preponderance of the white spots leaves only round, oval, or wavy lines or strands of brown pigment, which give the appearance of lace with large meshes, the interstices being formed by the white spots, which are round, oval, gyrate, linear, or irregular. In this way the skin in the course of months, and in some cases of a year or more, gradually seemingly returns to its normal condition. In the study of these cases I have sometimes seen during the activity of the process a mild and ephemeral hyperæmia which might easily have escaped observation, and the question suggests itself to my mind whether or not a mild form of congestion may precede the hyperpigmentation.

The third or marmoraceous form of pigmentary syphilide is by far the least common. Its mode of invasion is slow and aphlegmatic, and there is little or no hyperpigmentation. The natural color of the skin, in spots of irregular size and shape, becomes white, while the margins, which are hazy and indefinite, become browner than normal. It seems to be a displacement of pigment resembling strikingly some delicate varieties of marble in which there are imperceptibly blended shades of white and very light black. In my experience, this form is always seen on the sides of the neck, and it does not show a tendency to extend. It can only be found upon persons of delicate skin, and very often only by close observation. It slowly disappears and the skin is left in its normal color.

I attach little if any importance to the mass of literature relating to the pathological anatomy of the pigmentary syphilides, since the investigations were made in general at haphazard upon any pigmented or achromatic skin without any consideration for the stage of the process or for the clearness of the diagnosis.

Maieff's<sup>1</sup> observations, made under the direction of Professor Tarnowsky, are worthy of unqualified acceptance, for the sections of skin were taken only from patients suffering with the primary pigmentary syphilide, and the morbid process was studied upon very many sections made in tissues in all the progressive stages from its evolution to involution. Further, these microscopic studies were supplemented by prolonged and accurate clinical observation. Maieff thinks the pigmentary syphilide is due to a chronic specific inflammation of the minute blood-vessels of the skin, which may be due to nutritional changes incident to the early and active period of syphilis. At its inception the morbid process consists in endothelial inflammation with cellular infiltration into the adventitia of the vessels, which are thereby diminished in calibre and even occluded. As a result of the circulatory disturbance the red blood-cells lose their pig-

<sup>1</sup> "Contribution à l'Étude de la Syphilide pigmentaire," *Comptes rendus du Congrès international de Dermatologie et de Syphiligraphie*, Paris, 1890, pp. 677 et seq.



ment, which escapes and infiltrates the adventitia of the vessels, the connective-tissue cells, those of the derma and of the Malpighian layer, and even works its way into the lymphatics. During the evolution of the process most of the altered vessels become completely obliterated; the papillæ become stunted and undergo atrophy. Then the pigmentation begins to be gradually absorbed, the color of the skin grows less intense, and gradually and slowly the discoloration disappears, leaving in its wake a whitish surface.

These microscopic demonstrations, it will be seen, agree perfectly with the clinical history of the pigmentary syphilide, and show beyond a doubt that this eruption has a definite and orderly mode of evolution and of involution.

In the light of its clinical history and of its pathological anatomy it is, I think, now clearly proved that this syphilide begins as a true specific superpigmentation, which is the essential feature of the morbid process, and that the subsequent leucodermatous changes are those of a degenerative nature, consequently dependent upon and secondary to the initial dischromia. It can therefore be seen how illogical and incorrect it is to call this affection syphilitic leucoderma or syphilitic vitiligo.

This view has further the support of Dr. Fiveisky,<sup>1</sup> who studied the subject exhaustively under the direction of Profesor Tarnowsky. Fiveisky agrees with my contention, that the syphilide constitutes one of the most characteristic and most reliable diagnostic signs of secondary syphilis.

**Diagnosis.**—In the stage of superpigmentation the case may be mistaken for chloasma if the history is not clearly brought out. When the white spots have become plainly visible, a diagnosis of leucoderma may be made. But usually the situation of the eruption, chiefly on the sides of the neck, will point to its specific nature. Then, again, in leucoderma the white patches have a distinctly brown though narrow margin, which is never seen in the pigmentary syphilide. The diagnosis of the syphilide from tinea versicolor is readily made. This eruption rarely exists on the sides of the neck alone, and if present there is continuous with large patches on the trunk. It is usually darker in color, slightly elevated, and scaly, and may be attended with mild pruritus. If a few scales are removed and microscopically examined, the microsporon furfur will be readily seen among the epithelial cells. The pigmentary syphilide is not a scaling affection, and if any scales are scraped from the surface no micro-organism will be found.

#### ADDISON'S DISEASE AND SYPHILIS.

In connection with the pigmentary syphilide the description of Sacaze's<sup>2</sup> case, in which Addison's disease developed in a syphilitic subject, is interesting. The patient was a man twenty years old. Six months after infection he was attacked by a generalized pigmentation of face, neck, hands, genital organs, and inner surface of thighs. Besides this dischromatous change there were loss of strength and appetite, lumbar pains, hebétude, and gastralgia. Mercurials, tonics, and hydrotherapy produced only temporary benefit. In a short time profound asthenia

<sup>1</sup> *Méditsinskoié Obozrenië*, No. 2, 1891, p. 167.

<sup>2</sup> "Syphilis avec Syndrôme Addisonienne," *Gaz. des Hôpît.*, No. 7, p. 58, 1895.

and vomiting supervened. The patient died of marasmus in the fifteenth month of infection and nine months after the onset of Addison's disease. Sacaze suggests that in cases of this disease, other causes being absent, it is well to ascertain whether the patient has had syphilis.

### Precocious Gummata.

Since it is not at all uncommon to observe the precocious evolution of gummata even as early as the second or third month of the infection, it is necessary to describe these lesions in this place.

There are three distinct varieties of early or precocious gummata—a generalized, a localized, and a neurotic variety.

The generalized form appears as early as the eighth week of infection, and at any time during the first and early parts of the second year, the rule being that the earlier the date of appearance the more extensive is the eruption and the more numerous the lesions. It begins in the form of small circumscribed swellings under the skin, usually unattended with pain and only perceptible to the touch. In a short time these become adherent to the skin, and then they appear like bright-red spots, which are frequently looked upon as blind boils. Thus early they are found to be round or oval tumors of the size of a bean deeply set in the skin. They grow quite rapidly, and within ten days may attain an area of an inch or inch and a half. A slower growth is also seen. As they increase in size their red color becomes more sombre, and perhaps coppery. When fully developed they present a quite firm structure, and may be said to be in the stage of condensation. Their course is usually quite constant and without much variation. As they grow older their red color becomes more coppery, and they gradually grow softer in structure, as if they were permeated with fluid. This may be called the stage of softening, which varies in degree in different cases. In some tumors there is simply a soft, yielding condition of the tissues; in others, what appears to be true fluctuation may be felt. To the inexperienced these tumors in the latter case may give the impression of abscesses and suggest the use of the knife, which, however, should not be used, since absorption may occur even in this stage of liquefaction of the gummy infiltration. Under favorable circumstances these lesions do not go on to ulceration, and they are then said to belong to the resolute variety of this early form of gummata. Then the tumors gradually lose the slight convex elevation which they had attained, and slowly flatten out, while they gradually melt away from their outer edge, their color fading *pari passu* until a pigment-spot is left which is most persistent upon the legs. Slight or severe cicatrices may also be left. The period of development of these tumors usually occupies from ten days to two weeks, but after that their duration is variable. Under careful treatment they may promptly retrogress, and may without it remain in an indolent condition in the second stage indefinitely.

This eruption is prone to appear symmetrically over the body, at first in a crop of goodly number, which may be increased by successive smaller ones at shorter or longer intervals. Sometimes, even when the general eruption is copious, medication is very efficient in the control of this syphilide, and new crops may be prevented if treatment is instituted

promptly. The arms, forearms, the scapular regions, perhaps the back, the anterior surface of the trunk, the gluteal regions, thighs, and legs, mostly on the anterior and outer aspects, are the parts usually invaded. On the legs these tumors frequently take on inflammatory action when complicated with varicose veins, with œdema, chronic eczema, dermatitis, erysipelas, and pediculosis.

In some cases the resolute tendency in this eruption is not observed, but a necrobiotic action soon appears. The stage of condensation is then quite short and softening begins early. The centre of the tumors assumes a dark-red color in one or in several spots, and distinct fluctuation is soon made out. Then slight ulceration begins, usually in several places, corresponding to the follicular openings, and very soon the epidermal roof of the tumor melts away, and an unhealthy ulcer with a slightly fungating greenish-red floor, covered with a sanious pus and surrounded by a thickened, deep-red, undermined, and more or less everted edge, is seen. As a rule, however, these precocious gummatous ulcers are more superficial than the tertiary ones; their floor is less deep, their edges less undermined and everted, and their whole appearance indicates that the destruction is less profound. The further course of these ulcers is largely dependent upon local and internal medication, without which it may be indefinite.

The concomitant symptoms of this generalized early gummatous eruption are those of the secondary period of syphilis. It frequently follows, and even coexists with, the generalized secondary rashes. There is usually much accompanying systemic reaction, cachexia, malaise, and disturbance of the nervous system.

The *localized form* of early gummata appears somewhat later than the preceding one; that is, at about the fifth month and within the first year of infection, and perhaps later. The difference between the two is mainly that of degree and extent of development of the lesions. Like the first variety, the evolution of the tumors is aphlegmasic, but a little more indolent and insidious; in short, partaking to a certain extent of the characteristics of both the very early secondary and tertiary gummata. The tumors present the same appearance, except that they are larger and perhaps not quite as salient as those of the first variety. The regions of the head and face, pharyngeal walls and mouth, the forearms and legs, are the ones upon which the eruption usually appears, though it is sometimes seen upon the trunk, arms, and thighs. The stages of condensation and softening are observed in the course of these tumors, which may become absorbed or may break down into ulcers which are larger and more pronounced in their features than the earlier ones.

The eruption is usually symmetrical in the early months of syphilis, and it shows a progressive tendency to unsymmetrical development as it appears later in the disease.

These two forms of gummata are found in aged persons, in those given to alcoholic excesses, in subjects of strumous tendency, and those debilitated by any exhausting cause or adynamic influence, such as visceral diseases, fevers, pneumonia, diphtheria, chronic malaria, want and squalor, and in persons of poor fibres.

The *neurotic form* of the early gummata has a marked individuality of its own, and presents points of resemblance to erythema nodosum. In



the very early months of syphilis, either in the stationary period of an early syphilide or at its decline, generally preceded or accompanied by severe neuralgic symptoms involving the facial or cranial, intercostal, anterior crural, or any cutaneous nerve, by cephalalgia continuous or nocturnal, by rheumatoid pains in the muscles or joints, and by malaise and debility, this eruption makes its appearance with more or less promptitude and develops quite rapidly. In some instances so acute is the invasion that in a week we may find fully-developed tumors an inch or two long, but in general their evolution is rather less rapid. In addition to the neuralgic phenomena, local pains on the sites of the lesions or on the whole territory or limb on which they are developed are complained of. These pains may be continuous or intermittent, and in some instances are as excruciating as in severe herpes zoster. They are described as flashing, burning, lancinating, and are sometimes said to resemble those of an abscess. In some instances the patient's sufferings are less after the evolution of the syphilide, but in most cases the tumors are so painful that patients shrink in terror from their palpation. There is also a moderate febrile movement, an evening temperature of  $100^{\circ}$  or  $101^{\circ}$  Fahr., and in very severe cases as high as  $104^{\circ}$ ; emaciation, want of appetite, and all their concomitant symptoms. The seats of predilection are the forearms and legs, but the tumors may appear on the shoulders, arms, thighs, chest, and trunk. As a result of the pain and swelling in the arms and legs there are more or less discomfort, stiffness, impairment of motion, even to the extent of pseudo-paralysis.

The eruption consists of two orders of lesions: first, oval or round tumors, or irregular plaques from fusion of tumors; second, tumors or nodosities seated in the subcutaneous tissues, and at first freely movable under the skin and fasciæ, and later on adherent by both their upper and lower surfaces.

The cutaneous tumors begin by infiltration in the deeper portions of the skin and its contiguous connective tissue. When first seen they are in bright-red and rather sharply circumscribed spots, which soon form round or oval swellings, slightly raised and convex. In some cases the bright-red color rapidly becomes darkened until a blackish-red or decidedly ecchymotic appearance is seen, while in others it is of a deep bright-red similar to that of erythema nodosum.<sup>1</sup> In some cases, again,

<sup>1</sup> The coincidence of erythema multiforme with syphilis has been observed by Danielsen (*Norsk Magaz. f. Lægervidsk.*, iv. 6), Lipp (*Archiv für Dermatologie und Syphilis*, 1871, vol. iv. p. 221), and Finger ("Ueber den Zusammenhang der multiformen Erytheme mit dem Syphilis-Process," *Prager med. Wochenschrift*, 1882, p. 262), and has been the subject of a recent paper by Bronson ("Erythema Syphiliticum," *Medical Record*, Sept. 4, 1886), but beyond the fact that in such cases syphilis runs a severe course, as I myself have observed, little which is definite or practical has been evolved. The consensus of opinion concerning this coincidence seems to be that these symptoms are the result of angio-neuritic disturbances, and, though due to some occult influence of the syphilitic diathesis, are not pathognomonic of the disease. Bronson goes still further in holding that, though they may begin as simple eruptions, they may later on assume a true syphilitic nature.

I am firmly of the opinion that the precocious neurotic gummata are purely of syphilitic origin and nature, and not in any sense intercurrent simple eruptions. As in the palate, throat, iris, and periosteum there is often precocious gummatous infiltration, so in the subcutaneous connective tissue of the skin, which is essentially the one upon which the activity of syphilis is spent, may this precocious development take place. In syphilis, as in sarcoma and leprosy, while in general its new growths are slow, aphlegmasic, localized, and chronic, in exceptional cases they be precocious, generalized, and very active.

the red centre pales and becomes the color of white wax or of a billiard ball, while the deep red border or areola remains in various stages of intensity, consisting of a commingling or play of colors, such as we see following a bruise or erythema nodosum. In many cases resolution takes place; in others the stage of softening may end in ulceration. The resulting ulcers present all the characters of the late gummata, except that they are rather more superficial. Their subsequent course is usually chronic and aphlegmasic. In some cases general inflammation and swelling attacks a limb or the seat of these lesions, and the patient's suffering is thereby much increased. Commonly, these tumors or ulcers remain separate, but sometimes they increase and coalesce. They are, as a rule, symmetrically placed. The resulting cicatrices are usually slight and superficial.

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## CHAPTER LXII.

### AFFECTIONS OF THE VARIOUS MUCOUS MEMBRANES.

#### **Erythema, Mucous Patches, and Condylomata Lata.**

THE mucous membranes continuous with, and rather remote from, the muco-cutaneous junctions are frequently affected in the secondary stage by hyperæmic and hyperplastic processes.

Erythema of the mucous membranes is usually identical, in the time of its appearance and in its general character, with the same eruption upon the skin. Like the latter, it ordinarily appears six or eight weeks after infection, and may affect any of the outlets of mucous canals, although it is most frequently seen upon the fauces, pituitary membrane, and genital organs, and in many instances doubtless fails to attract attention. It is most frequently seen upon the fauces in persons exposed to sudden changes of temperature, in smokers, and in those who are subject to frequent attacks of catarrh; upon the vulva in women who have frequent sexual intercourse; and upon the glans penis in men with a long prepuce. It may be the only general lesion present, or more frequently it is accompanied by other early manifestations. It may occur in patches like the erythematous syphilide upon the skin, as in a case described and figured by Ricord of erythema of the glans penis coexisting with roseola upon the trunk, in which the former eruption was arranged in circles of a bright-red color, enclosing sound portions of the mucous membrane and closely resembling the roseola upon the body. As a general rule, however, especially upon the fauces and vulva, the eruption is diffused and its outline well defined.

Syphilitic erythema of the mucous membranes may exhibit more redness of the surface, without structural changes in the tissues. In some cases, however, the epithelium has a milky hue, and becomes detached in spots, giving rise to erosions. The surface is sometimes dry, and at

other times smeared with an abundant secretion. There is usually but little swelling, except when the vulva, the tonsils, and the pituitary membrane or the labia minora are affected. In the case of the nose the swollen folds of mucous membrane may interfere with breathing or the passage of the tears through the lachrymal ducts, and also obstruct the Eustachian tubes. Aside from these mechanical annoyances, it is attended with but little pain or inconvenience.

This eruption often disappears quite suddenly, but is very prone to return.

The name "mucous patch" is applied to a lesion peculiar to syphilis, consisting of elevations of a more or less decided rose-color, frequently rounded in form, the surface resembling a mucous membrane, and situated in the neighborhood of the outlet of mucous canals, especially around the genital organs and anus, upon the mucous membrane of the mouth, and sometimes upon other parts of the body, more particularly at the base of the nails and wherever the reflection of the integument upon itself forms natural folds in the skin.

This affection is one of the earliest and most frequent secondary manifestations of syphilis, and is therefore one with which the student of syphilis should be perfectly familiar; unfortunately, obstacles have been placed in the way of acquiring a knowledge of it by the confusion which has been introduced in its classification and in the terms which have been applied to it. Different authors, according to the views they have entertained of its nature, have described it among tubercles, pustules, and papules, and have called it by the corresponding names of "mucous tubercle," "pustule," or "papule." But the first two of these terms are entirely inappropriate, since it does not resemble syphilitic pustules or tubercles in its time of development, its symptoms, course, or termination. The name "mucous papule" is less objectionable, since it consists in most instances of a development of the papillæ, forming broad elevations above the surrounding surface; but it is not always elevated, and may even be excavated, and it is, moreover, so distinct in its characters from ordinary papules, and of such importance as an indication of constitutional infection, that it is well to retain the name "mucous patch."

As regards its **histology**, this lesion is found to consist mainly in a marked hyperplasia of the papillæ, and an abundant proliferation of cells in the mucous layer, which present a muddy appearance due to granular changes in their protoplasm and segmentation of their nuclei. The sheaths of the hair-bulbs and the walls of the vessels are likewise infiltrated and thickened. The surface of the patch may retain its epithelium, or the latter may become detached and removed; it may either become depressed below the surrounding surface of the process of ulceration, or rise above the same in consequence of further development of the papillæ, whence arise the various appearances which this lesion may present.

As already stated, this lesion is found at the outlet of mucous canals and upon those portions of the external integument which are maintained by contact in a constant state of warmth and moisture, and are thus very nearly in the condition of mucous surfaces.

**ERYTHEMA AND MUCOUS PATCHES OF THE MOUTH.**—Erythema of the buccal cavity is usually confined to the neighborhood of the fauces.



It may readily be confounded with the effects of an ordinary cold, from which it often can be distinguished only by the history of the case. The presence of narrow, dusky-red bands of inflammation along the border of the velum, ending abruptly at the base of the uvula, is considered by some observers to be characteristic of syphilitic erythema. Associated with this condition, as well as with other lesions, there is often a general œdema, especially of the velum and uvula. The latter organ may become very much swollen.

The most common syphilitic lesions of the mouth are mucous patches. They are most frequently found upon the tonsils, the uvula, the velum palati and its pillars, the sides of the tongue, and the mucous surfaces of the lips, especially the lower. At the angles of the mouth they are often continuous with a pustular eruption upon the integument. The inner surface of the cheek near the last molar tooth is another favorite seat. The dorsum of the tongue and the gums are less frequently affected. Their most characteristic feature is the grayish-white color, appearing as if they had been pencilled over with a crayon of nitrate of silver, which has given them the name of "opaline patches." They are more irregular in their outline than condylomata, and, unlike the latter, are not, as a general rule, perceptibly elevated above the surface. In some cases the adventitious deposit which gives them their grayish color, and which is with difficulty removed, is confined to the irregular margin of the patch, while the centre remains sound; and when presenting this appearance they have been compared to the track of a snail.

Papules are often seen in the mouth coincidently with a general papular eruption. Owing to the constant maceration of the mucous membrane of the mouth, the formation of vesicles is rare if not impossible.

The name "*plaques des fumeurs*" has been given to certain patches most frequently seen on the mucous lining of the cheeks near the angles of the mouth. They occur most frequently in the mouths of inveterate smokers, and are due to the proliferation of the epithelium, which becomes opaline, as though the spots had been touched with carbolic acid or with nitrate of silver; the patches are sometimes fissured, and may become eroded, although the epithelium is usually very adherent. They are generally quite obstinate, and persist long after the apparent extinction of the infection.

**Treatment.**—Mucous patches of the mouth, from which infection so often occurs to innocent persons, should be carefully and regularly treated. The morbid parts may be touched with a tampon moistened in a solution of nitrate of silver (30 gr. to water 1 ounce), or this may be used as a spray. The mouth should be constantly rinsed and the throat gargled with strong solutions of borax, chlorate of potassa, and alum. Particular attention should be paid to the condition of the stomach, and plain, nutritious food should be allowed. Smoking is to be absolutely interdicted, and the use of stimulants and irritating condiments is to be suspended.

In some cases the application of a 1 or 2 per cent. watery solution of chromic acid is very efficacious.

**SUPERFICIAL AFFECTIONS OF THE TONGUE.**—Coincidentally with pharyngeal erythema the mucous membrane of the tongue may also become hyperæmic. In some cases the morbid process extends over the

whole tongue, while in others it occurs in the form of round or oval disks scattered over the dorsum. From these hyperæmic patches the epithelium may be removed, and as a result they are seen eroded or even perfectly smooth, and showing plaques, of which there may be one or two or several. This condition, somewhat frequently seen in syphilis, is also observed in the mouths of non-syphilitics, particularly in those who suffer from gastro-intestinal troubles. Excoriated or smooth round or oval patches of the tongue are not, therefore, pathognomonic of syphilis.

Not uncommonly we see scattered over the tongue and on its tip and sides little irregular patches of epithelial hyperplasia which have a bright or a dull pearly-white surface. These lesions, due to circumscribed areas of hyperæmia, are as small as a pin's head and perhaps of the extent of one or two lines. They are usually a little salient. By means of local and general treatment these lesions may be removed, but they are often very obstinate and persistent.

Mucous patches of the tongue are not at all infrequent, and are found chiefly on its tip or on its sides. They are more or less annoying or painful, and in smokers and persons suffering from indigestion they show a tendency to become chronic and to relapse in an exasperating manner. They may be complicated by general lingual hyperæmia.

As a result of erythema and mucous patches of the tongue, this organ becomes the seat of fissures which are developed either over the dorsum or on the sides. On the dorsum of the tongue these fissures are irregular and sinuous in shape, while on the sides and at the tip they are in general vertically placed. Coexistent with this fissuration of the tongue there is usually mild or severe epithelial hyperplasia.

These lesions are obstinate in their course, and they present decided evidence of being of epithelial structure. These plaques have been variously called psoriasis, ichthyosis of the tongue, and leukoplakia. When they begin in the secondary period, it is usually not difficult to establish the fact that they originated in a syphilitic soil. But when they develop late in the infection, there may be some doubt as to their etiology. These lesions belong to the class of parasymphilitic manifestations, which are usually processes or conditions resulting from irritative changes left by the original syphilitic inflammation. They are the outcome, but not the essential derivatives, of syphilitic infection.

These lingual lesions are very prone to lead to epitheliomatous degeneration, hence their bearers are always in jeopardy.

**Treatment.**—The treatment of mucous patches and of the milder forms of epithelial hyperplasia of the tongue is similar to that of mucous patches of the mouth.

In the obstinate cases of fissures a gargle of bichloride of mercury in water, 1:1000, is sometimes very beneficial. In some cases these lesions require active but carefully applied cauterization, either with equal parts of carbolic acid and glycerin or nitrate of silver and water, even as high as 10 per cent. Strong applications should only be made at intervals of several days. In the interim mild and astringent solutions of alum or tannin may be used.

For epithelial plaques it may be necessary to apply liquid carbolic acid or a solution of caustic potassa (3j to water 3j). These cases sorely tax the patience of the afflicted person and of the surgeon.

In all cases of syphilitic inflammation of the tongue it is most important that every source of irritation shall be removed.

Internal treatment has no influence whatever upon the psoriatic or ichthyotic patches of the tongue.

#### AFFECTIONS OF THE NOSE.

The pituitary membrane may be the seat of erythema, superficial ulcerations, and mucous patches, which give rise to symptoms resembling those of an ordinary catarrh. Besides these lesions, in some cases an adenoid tissue is developed which gives much trouble and annoyance by stopping up the nasal passages. Sometimes an ulcer may be seen just within the nasal orifice, surrounded by swollen mucous membrane and rendering the alæ nasi tender upon pressure. Plugs of inspissated mucus, mixed with blood and pus, which obstruct the passages, are from time to time discharged. The nasal secretion is more abundant and more purulent when ulcerations or mucous patches exist. In the absence of other lesions of syphilis upon the skin or elsewhere, the character of the nasal affections may be suspected only because of their persistence.

**Treatment.**—In treating erythematous, exulcerous conditions, mucous patches, and adenoid inflammation in the nose it is of prime importance not to use strong stimulating applications, except under certain restrictions. The parts should be sprayed several times a day with Dobell's solution. The very mild solution of nitrate of silver (gr. j to ʒviij water) may be used, and very frequently insufflations of equal parts of iodoform and boric acid are very beneficial. In all cases, as a rule, an active internal treatment should be administered.

#### AFFECTIONS OF THE LARYNX.

In the secondary stage the larynx may be attacked by (1) erythema, (2) superficial ulcerations, (3) mucous patches, (4) chronic inflammation, with hypertrophy of the mucous membrane and vegetations.

With regard to laryngeal syphilis in general, it seems to be true that the more remote a lesion is from the entrance to the larynx the more serious will be its consequences, and that the subjective symptoms of a lesion are by no means commensurate with its gravity. For instance, a superficial ulcer may be complicated by an acute œdema so general and so excessive as to threaten life; on the other hand, a destructive process may have gone on to a considerable degree while the patient is in ignorance of his condition. The invasion of the larynx by syphilis is usually very insidious, and the subsequent course of the lesions is chronic and devoid of pain. It is very probable that the parts of the vocal organism most often in contact during the performance of its function are more frequently attacked by syphilis. Hence the vocal cords and the arytenoids are the most susceptible structures.

**Erythema.**—Erythema of the larynx, unless it be very acute and attended by œdema, may be so slight as to attract no attention, the only symptoms being slight huskiness of the voice and moderate catarrh. No doubt it occurs during early skin eruptions, and it is frequently developed at more advanced stages, either independently or in connection with deep laryngeal lesions. There may be nothing in the appearance



of the affection to distinguish it from a simple catarrh. It occurs either in patches, which give the mucous membrane a mottled appearance, or it may be limited to certain regions, or it may be diffuse, the lining of the larynx having a uniform dusky-red hue. There may be superficial erosions of the mucous membrane. The vascularity of the affected parts is much increased, the blood-vessels often presenting the appearance referred to by Krishaber and Mauriac as "*arborization*." When the epiglottis participates in the affection and in the concomitant œdema, it may be much tumefied and assumes a bilobed shape.

*Superficial Ulcerations.*—The superficial ulcerations observed in laryngeal syphilis involve only the mucous membrane, and, according to Bäumlér, usually begin in mucous follicles at the posterior commissure. They may affect phonation to some extent, but are generally very sluggish, persisting with slight change for an indefinite period. Their margins are well defined, quite regular, and very slightly elevated above the surrounding level. The surface of the ulcers is usually concealed by a layer of tenacious secretion. Frequently general erythema of the mucous membrane coexists. These early ulcerations, whose appearance is quite different from that of ulcers occurring at a later period, may be confounded with incipient tuberculous ulcers. They are not so likely as are the later ulcerations to be mistaken for epithelioma. The following points of distinction should be remembered: Tuberculous ulcers begin in the ventricular bands and are usually paler than those of syphilis. They are bathed in a copious muco-purulent secretion. There are decided swelling and œdema of the arytenoids, while the mucous membrane elsewhere is anæmic. The course of phthisical ulcers is more rapid and painful, and pulmonary symptoms coexist or are soon manifested. Whistler states that in syphilis the voice is rough and rasping, while in phthisis it is whispering and moist, suggesting the presence of excessive secretion. The absence of ulceration in the mouth, the blanched appearance of the palate and fauces, while the pharynx may be congested, are indicative of the tubercular character of laryngeal ulceration. Symmetry in the position and outline of syphilitic ulcers is considered characteristic by some authorities.

Great diversity of opinion has prevailed, even since a method of inspecting the larynx during life has been provided, regarding the frequency of mucous patches. Ferras considers them very rare, having found them in only one instance among nearly 100 cases of syphilis. Krishaber and Mauriac, on the contrary, found 10 cases of mucous patches in 14 of laryngeal syphilis, the former observer discovering them only on the vocal cords. Whistler states that he has met with 24 cases of this lesion among 88 of syphilis in its secondary stage. In his experience the time of its occurrence varied from one and a half to twelve months after primary infection. In all cases mucous patches of the mouth or genitals coexisted; in 7 cases papular or papulo-squamous eruptions were found, in 1 case associated with a roseola. In 1 case six weeks after infection the indurated cicatrix of a chancre was still present. Enlarged glands and alopecia occurred in many instances. In 10 cases the epiglottis was the seat of the lesion, and in 10 the vocal cords; in 4 cases the arytenoids, in 2 the interarytenoid fold, in 2 the ventricular band, and in 1 the glosso-epiglottic fold. When seated on

parts exposed to irritation, either in respiration or in phonation, mucous patches of the larynx are prominent with ragged margins, forming what are known as *condylomata*; in other regions they are flatter and the ulceration is more sharply cut. Their surface is covered by a scanty viscid secretion. The removal of this film exposes a red, excoriated surface in striking contrast with the paler hue of the surrounding mucous membrane. Sometimes the centre of a patch is slightly depressed, its borders remaining prominent. Besides the ulcerated form of mucous patch, we also meet with the *opaline patch*, according to Whistler more often on the epiglottis and on the arytenoids. In these lesions the epithelium is thickened and still adherent, the deeper tissues being infiltrated with new cells. The opalescent appearance is attributed by Cornil to minute collections of pus amidst the epithelial cells.

Chronic inflammation of the larynx is an intermediate lesion; it may follow an early catarrh or may not appear until three or four years after infection. The color of the mucous membrane is decidedly darker than in the early erythemas, although Whistler affirms that it never deserves the name "coppery" which has been applied to it by some authors. The affection is very persistent, and commonly leads to thickening or *hypertrophy* of the mucous membrane, which, according to Krishaber, is the only one of the early lesions which does not disappear spontaneously. This thickening is quite different from the oedema occurring with an erythema, in which the mucous membrane has a puffy appearance. The thickening of the cords may be so great as to require operative interference for the relief of the dyspnoea. A remarkable instance of this condition has been reported in which tracheotomy was done four times during a period of five years. Associated with this condition chronic ulcers are almost always found. These ulcers have ragged and thickened edges; frequently vegetations spring from them which may reach a considerable size, even to the degree of producing aphonia and of impeding respiration. The vocal cords, which are thickened and rough, are very often the seat of these ulcers. The ventricular bands may be so swollen as to overlap the cords. The *vegetations*, which may grow from the margins of an ulcer or from other portions of the mucous membrane, are often difficult to distinguish from simple polypoid growths. Their favorite seat is at the insertion of the inferior vocal cords. Ferras states that they may appear in the ventricles of the larynx, where natural papillæ are scanty. The history of the case, or even the empirical use of specific treatment, may sometimes be required to determine their character.

**Symptoms.**—There are certain symptoms, some of them common to many of the lesions of laryngeal syphilis, which deserve special attention. Spontaneous pain is very rare. It is considered an indication of the invasion of fibrous or cartilaginous tissues. Cough is also an extremely rare symptom, and expectoration, if present, is scanty, mucous, or muco-purulent. The sputa may be tinged with blood from an ulcerative lesion or from ruptured capillaries. In cases of caries or necrosis they may contain fragments of cartilage or bone. In the latter condition also the breath is likely to have a fetid odor. Alteration in the volume and quality of the voice may be very slight, even in severe lesions. Frequently the voice becomes hoarse or assumes a character called by the French "*crapuleuse*." Sometimes it is reduced to an almost inaudible

whisper. Dysphagia is quite infrequent except in very advanced stages of disease or when the epiglottis is attacked. Dyspnoea may supervene in consequence of stenosis due to various causes, chief of which are œdema, growths which invade the air-passages or occlude them by pressure from without, and cicatricial contractions. Probably spasm may be an occasional and temporary cause of dyspnoea. Œdema may occur with any lesion of syphilis. The submucous effusion may take place rapidly, in which case the danger to life is imminent, or it may be gradual. In the latter case the patient may accommodate himself to a very considerable diminution in the calibre of the larynx. The disappearance of an acute œdema is usually proportionately rapid, while a slowly-formed effusion may persist for a long time. Among new growths which may cause stenosis of the larynx are to be included vegetations, hypertrophy of the mucous membrane following chronic inflammation, gummy tumors, and exostoses. The most intractable cases of stenosis are those due to gradual contraction of cicatrices. This unfortunate result usually follows only the deep ulcerations of the later stages of syphilis. Superficial ulceration may involve quite extensive surfaces, producing complete aphonia and other pronounced subjective symptoms, yet a cure may be obtained with entire restoration of the functions of the larynx. It is in these cases of stenosis from cicatricial contraction that the operation of tracheotomy is sometimes necessitated. The experience of Krishaber, however, authorizes confident delay of surgical means of relief, even in the case of alarming dyspnoea from *other* causes, the energetic use of specific remedies, especially by the hypodermic method, having been promptly efficacious in many instances.

The larynx may also be occluded by the formation of false membrane between the vocal cords. This is rather a rare cause of stenosis. Elsberg stated that in about 270 cases of laryngeal syphilis he had met with this condition six times. It may result from superficial ulceration, and, on the contrary, has been observed in conjunction with destruction of the cartilages and other late lesions. The process appears to begin usually at the anterior commissure, leaving a passage for the air posteriorly. It may take place in a reverse direction, or an aperture may be left in the middle of the rima glottidis or along the edge of the vocal cord.

**Treatment.**—The early efflorescences in the larynx usually disappear quite promptly under the influence of internal treatment. If they are obstinate, they usually yield rapidly to the nitrate-of-silver spray (gr. j-iv to ʒviij water).

Deeper lesions should be treated by occasional moderately strong cauterization (nitrate of silver or carbolic acid), followed by spraying with Dobell's solution. When there is ulceration, insufflation of equal parts of iodoform and boric acid is required.

#### MUCOUS PATCHES AND CONDYLOMATA OF THE GENITAL ORGANS.

The most frequent seat of mucous patches in men is around the anus and within the mouth, and in women upon the vulva. It has been asserted that they are much more frequent in the latter than in the former sex, but the difference is probably not so great as has been supposed. There is certainly no more common symptom in male patients affected



with syphilis. They are also present in most cases of hereditary syphilis in infants, and, in consequence of the moist condition of the integument at this early age, are not confined to the regions above mentioned, but may be scattered over the whole surface of the body, and especially the nates and thighs.

The development of mucous patches is everywhere favored by inattention to cleanliness, and in the mouth by the use of tobacco, either by smoking or chewing: in men who are habituated to these practices they constitute one of the most persistent and troublesome symptoms we have to deal with, and in dirty prostitutes of the lower class they are equally abundant and obstinate about the genital organs.

Mucous patches vary in appearance according to their situation. The chief points of difference are found between those seated upon the external integument and those upon membranes which are strictly mucous.

The former, which are met with for the most part around the anus and genital organs in the two sexes, consist of rounded disks, either single or aggregated, of a reddish or grayish color, granulated and elevated to the height of about a line above the integument, upon which they appear to be superimposed like a number of cones laid upon the part. They then receive the name of *condylomata*. Their appearance is so peculiar that when once seen it cannot be forgotten.

#### CONDYLOMATA LATA.

The mode of development of *condylomata lata* is as follows: A red spot first appears upon the skin, and a slight effusion takes place beneath the epidermis—sufficient to loosen it from the derma, but not to raise it in the form of a vesicle or bulla; the epidermis is removed by friction or falls off, and exposes a raw surface, upon which a moist grayish pellicle is formed; the surface is elevated by hypertrophy of the superficial layers of the skin, and gives rise to the broad, flat, wart-like disks above referred to.

In Fig. 206 *condylomata lata* situated around the vulva and anus are graphically portrayed. In Fig. 207 *condylomata lata* of the anus of a man are well shown.

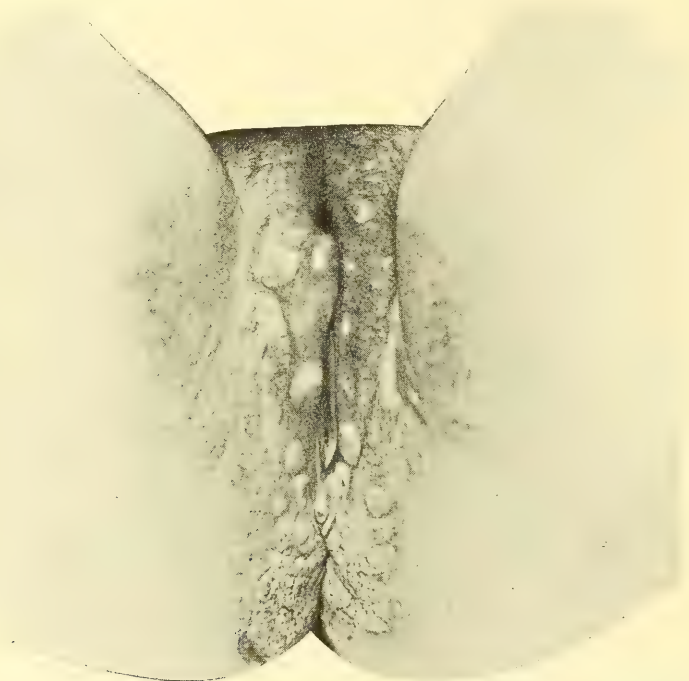
Another and a very singular mode of origin of mucous patches is from the surface of a chancre, which during the reparative process may granulate above the surrounding integument and become covered with a thin, translucent, and grayish pellicle. This transformation of a primary into a secondary symptom has already been described in the chapter upon Chancre.

When originating from a chancre, mucous patches are seated upon an indurated base, but otherwise the tissues beneath them are found on pressure to retain their normal suppleness. Contrary to the statements of some authors, they never present the copper color of other syphilitic eruptions, but are either of a reddish- or grayish-white color. If the patient happen to be jaundiced, the pellicle covering them may be tinged with yellow. They are usually smeared with a very offensive muciform secretion, which is peculiarly unpleasant when the patches are seated in the neighborhood of the genitals. The odor is so strong as to pervade the whole room. In a few exceptional instances the patches are dry.

Mucous patches readily become ulcerated. When exposed to friction against the clothes or the opposed integument, the pellicle covering the patch is removed, and a red, superficial, but depressed ulceration takes the place of the elevated disk. Such is the origin of the raw surfaces frequently seen upon the sides and front of the scrotum in syphilitic patients.

Ulcerated mucous patches upon the margin of the anus closely resemble ordinary anal fissures, from which they may be distinguished by their more prominent and rounded edges and by the grayish pellicle which is

FIG. 206.



Condylomata lata of the vulva and anal region. On the latter they present a papillomatous or vegetating appearance.

generally visible upon the sides of the cleft. When situated between the toes, they yield a thin, brownish, and very offensive discharge, and they often project upon the dorsum or palmar surface of the foot in the form of a crescent at the base of the interdigital sulci. Ulcerated and fissured mucous patches upon the margin of the anus, between the toes, or elsewhere are called *rhagades*.

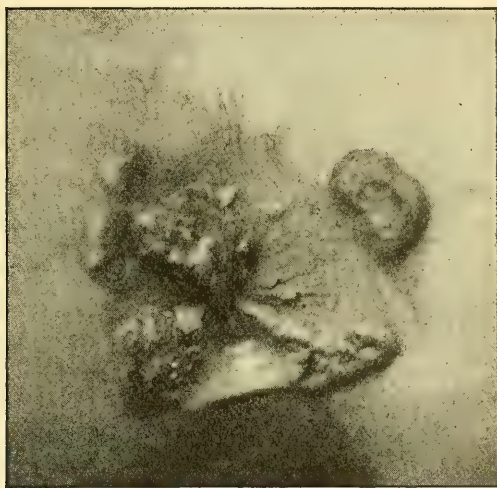
Condylomata upon the vulva are generally elevated and of a reddish color. Those that occur within the vagina and upon the cervix uteri more closely resemble mucous patches upon the external integument than those situated upon other mucous membranes, as, for instance, within the buccal cavity. Mucous patches upon the genital organs in both sexes sometimes give rise to a discharge resembling gonorrhœa from the neighboring mucous membrane, which is not unfrequently observed about the

time that early secondary symptoms appear or when a relapse of general symptoms takes place.

Unlike most syphilitic eruptions, mucous patches are frequently attended by pruritus, especially when seated upon the scrotum or perineum, and when proper attention is not paid to cleanliness or the parts have become warm and moist from exercise or prolonged contact in bed. The unquestionably infectious character of these lesions has previously been mentioned.

Mucous patches may react upon the neighboring lymphatic ganglia in the same manner as syphilitic eruptions situated upon the scalp, but only

FIG. 207.



Condylomata of the anus.

in case their development is attended by acute inflammation. Thus, the submaxillary glands are frequently swollen from sympathy with mucous patches upon the fauces, and the inguinal glands may be enlarged in consequence of the presence of condylomata upon the scrotum, but the effect upon the latter is less readily perceived, because they are generally indurated from their anatomical connection with the primary sore.

**Treatment.**—In all cases of mucous patches or of condylomata lata on or about the genitals an energetic systemic treatment should be adopted. Locally, the prime essentials are absolute cleanliness, as much dryness as can be obtained, and the covering of the parts by some protective substance, or the interposition of some absorbent material, cotton or gauze, between coapted surfaces. Black or yellow wash, applied on absorbent cotton, is very efficacious.

For anal condylomata in men Ricord's favorite treatment, which consists in washing them twice a day with Labarraque's solution of chlorinated soda, then sprinkling them with calomel, and separating the opposed surfaces by the interposition of lint, is generally very successful, but it is sometimes rather painful.

When these lesions are very large and papillomatous, they may be lightly and carefully touched with a solution of nitrate of silver (5j to



water ℥j), with chloroacetic acid, carbolic acid, or, in very exuberant cases, with the acid nitrate of mercury. After these active cauterizations the parts should be well washed and dried, and then dusted with some inert powder, over which a layer of absorbent cotton should be placed. Aristol, resorcin, or calomel in combination with starch or boric acid forms a pleasant and effective application for continual use.

In women especially the parts should be kept extremely clean and dry. Hot intravaginal injections of bichloride of mercury and water (1:3000 or 5000) should be used several times daily. The parts should then be dried and dusted with equal parts of calomel and starch, and an abundance of absorbent cotton should be kept on by means of a bandage if possible. In some of these cases active cauterization, preferably with carbolic acid, should be made.

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## CHAPTER LXIII.

### AFFECTIONS OF THE HAIR.

ALOPECIA is one of the most common symptoms of syphilis. By reason of its prominence and of its compromising character it is the source of constant worry and annoyance to its bearer. It varies from slight to almost complete loss of hair, which is rarely permanent, and its course may be rapid or chronic. It is attended by no subjective symptoms, such as heat or itching, and in most cases there are no marked lesions of the scalp, while in other cases the hair-follicles may be involved by macules, papules, pustules, or ulcers. The eyebrows, the beard, and moustache, the hair of the pubes and axillæ, may also be involved. The eyelashes are seldom attacked, except by ulcerative lesions, and alopecia never exists elsewhere without affecting the scalp. These may be called the essential alopeciæ, while loss of hair due to destructive or inflammatory lesions is a secondary form.

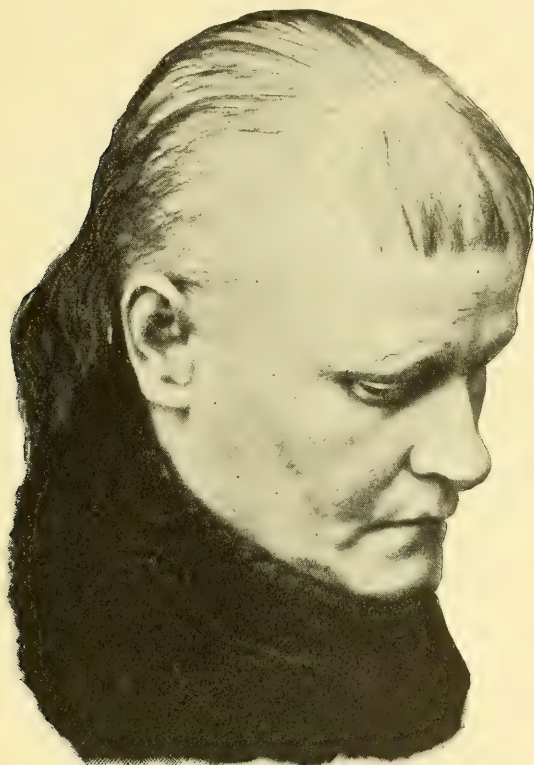
There are two varieties of syphilitic alopecia—one consisting of a simple thinning or more or less complete shedding of the hair, and the other of loss of the hair in tolerably circumscribed patches. They both occur with about equal frequency.

The first form of alopecia begins rather abruptly, and on each combing many hairs usually come away. On the scalp the result of this alopecia is generally striking, but it may be so slight as to pass unnoticed, the hair merely being thinned. The hair may be lost in one or more patches, which vary in size and occur without symmetry or order; they may be as large as the palm of one's hand, and several may fuse together. Their outline is irregular, and they show no tendency to assume a circular form. The surface of the patches is rather dry and somewhat scaly; the follicles are quite prominent, and scattered irregularly may be a few long hairs, sometimes one or more tufts, and minute hairs. The surface of the scalp

is dry and presents a few furfuraceous scales. In patients who have been subject to *seborrhœa capitis*—or, as it is generally known, *pityriasis capitis*—this condition is often much more marked.

Patients, especially men, who have suffered from this form of baldness not infrequently get into a state of mind in which, after the cessation of the fall, nothing can convince them that it does not yet continue. They

FIG. 208.



The diffuse shedding form of syphilitic alopecia.

come regularly with their complaints and sorrows, and often vainly pass their fingers through their hair, hoping to bring away a few with which to convince the surgeon that the affection is still active. In most cases this delusion is dispelled after a time. In Fig. 208 this form of alopecia is well shown. The general diffuse shedding of the hair of the scalp is typically portrayed. In this case there was loss of eyebrows and eyelashes.

The second or patchy form of syphilitic alopecia presents such striking features that when it is once seen it is thereafter readily recognized by the surgeon. The surface of the scalp presents a moth-eaten or mangy appearance. The hairs are generally dry and lustreless, giving the appearance of malnutrition. The bald patches are of irregular round or oval outline, and from fusion they become gyrate. The scalp is dry, scaly, and generally unhealthy in appearance. The hair-follicles are prominent, and from some of them stumpy hairs protrude.

This form of alopecia (admirably portrayed in Fig. 209) is usually most severe on the back and upper portions of the head, and less so on the sides and frontal region. It runs a chronic, sluggish course.

The hair-follicles may be involved by erythematous spots, papules, or pustules coincidently with a general eruption. In such cases the loss of hair is generally slight and scattered. The arch of the eyebrows may be interrupted by the fall of a few hairs or may be totally destroyed, giving

FIG. 209.



The moth-eaten form of syphilitic alopecia.

the patient a very peculiar appearance. In the beard, in the axillæ, and upon the pubes the loss of hair may also be partial, complete, or in patches.

Syphilitic alopecia is peculiar to the secondary period, and generally begins about the third month, at the decline of the earlier secondary symptoms. It may occur at any time before the end of the second year, and is very frequently associated with cachexia.

The pathological anatomy of the hair-follicles has been studied by Giovannini,<sup>1</sup> who found a small cell-infiltration in the connective-tissue

<sup>1</sup> "Delle Alterazione Anatomico-patologiche di una forma di Alopecia sifilitica," *Giorn. delle Mal. Ven. e della Pelle*, Dec., 1889, pp. 460 et seq.



cells of the periphery of the follicle, particularly around the vessels. This infiltration is seated in the lower two-thirds of the follicles, and extends to the inferior limits of the bulb. The infiltration penetrates even between the epithelial cells, which are altered at this point. As a result, the nutrition of the follicle is impaired and the hairs fall.

Darier<sup>1</sup> made microscopical examinations of the hairs in syphilitic alopecia. He found the following conditions: (1) in the majority of cases the shaft and bulb seem normal, but there is less pigment and the medullary portion may be absent; (2) the hairs at the bulb are smaller than the shaft to the extent of one-half or one-fourth the normal size; (3) the shaft is uniformly thin, except at the bulb, where it is pointed.

When ulcerative changes occur in the follicles, or when pustules attack the scalp, and sometimes even when erythematous spots and papules occur, the papillæ may be destroyed and the follicles become obliterated, permanent baldness resulting. This happens in a marked degree in connection with late tubercles and gummatous ulcers.

**Diagnosis.**—The diagnosis of syphilitic alopecia is to be made from pityriasis capitis (seborrhœa), senile baldness, and alopecia areata. The suddenness of invasion and the generally marked character of the baldness in syphilitic alopecia and its non-inflammatory course are in marked contrast with the chronic course and the scaly and somewhat pruritic condition of pityriasis capitis. Moreover, the suspicion of syphilis is confirmed by the history of the case and the discovery of other specific lesions.

Senile alopecia—incorrectly so called, since it usually begins in middle life—extends backward from the forehead or begins at the vertex, and is wholly unlike the syphilitic affection. Moreover, the scalp is smooth and shiny, and the follicular openings are no longer visible.

Alopecia areata is much more common in children than in adults, and occurs in round, oval, or serpiginous patches, the hair on other parts of the scalp being preserved. The surfaces of the patches are very smooth and polished, and of a yellowish-white color; they are not scaly, and they are completely destitute of hair.

The **prognosis** of syphilitic alopecia is in general good. In some cases the loss of hair is so extensive and its renewal so slow that permanent baldness seems to be inevitable. The main points upon which to base the prognosis are the extent of the baldness, its duration, and the patient's general health. If the affection has been severe and has existed for some time, if treatment has been neglected and incomplete, and if cachexia has taken place, the prognosis must be very guarded.

**Treatment.**—Cases of syphilitic alopecia call for a vigorous local and constitutional treatment. If possible, inunctions should be used on the neck and especially upper parts of the body. The hair of the scalp should be cut off quite close, and, if expedient, should be shaved, and frequent shampooing is very beneficial. Every day the morbid parts, and indeed the whole scalp, should be well rubbed with an ointment composed of white precipitate 30 grains and cold cream 1 ounce. This application may be made at night. The parts should be well washed with soap and

<sup>1</sup> "Sur l'Examen microscopique des Cheveux dans l'Alopécie syphilitique," *Annales de Derm. et de Syphil.*, 1889, pp. 198 et seq.

water in the morning, and twice during the day they should be vigorously rubbed with the following lotion, applied with a sponge :

R. Hydrarg. bichlor.,	gr. iv-viij ;
Tr. cantharidis,	ʒj ;
Tr. capsici,	ʒss ;
Liq. coloniensis,	ʒij ;
Aquæ,	ʒiv.—M.

## CHAPTER LXIV.

### AFFECTIONS OF THE NAILS.

SYPHILITIC affections of the nails are of two varieties: in one, called *onychia*, the disease begins in the nails themselves; and in the other, called *perionychia*, it begins in their vicinity and involves them secondarily. Their course is chronic, and may be mild or severe and destructive. They generally appear within the first two years of syphilitic infection, but their invasion may occur much later.

In syphilitic *onychia* the changes may be dry and confined to the nail-substance or the nail may be separated from its bed.

In the dry form, *onychia sicca*, called by Fournier “friable onychia” (*onyxis craqueté*), the nail gradually loses its lustre and transparency at its free edge and assumes a dull-yellow color; sometimes the disease is limited by a distinct line of demarcation or the whole nail may be involved. The edge of the nail becomes thickened and brittle, readily cracks, and may be deeply serrated (Fig. 210).

Its surface is rough, and presents shallow, longitudinal fissures and minute depressions, which collect the dirt. In some cases the morbid process begins as a small pinkish, perhaps scaly, spot limited to one segment of the reflection of the integument, just at the sulcus. From this focus the chronic inflammatory process extends both along the sulcus and into the nail, which it literally destroys. The epidermis under and beyond the free margin is usually thickened and scaly. Very often there is but slight inconvenience from the disease, and the deformity may be remedied by careful paring of the nail. In some cases, however, the process becomes so intense that the whole nail is converted into an irregular rough plate, causing great deformity of the hands, which is very annoying to patients.

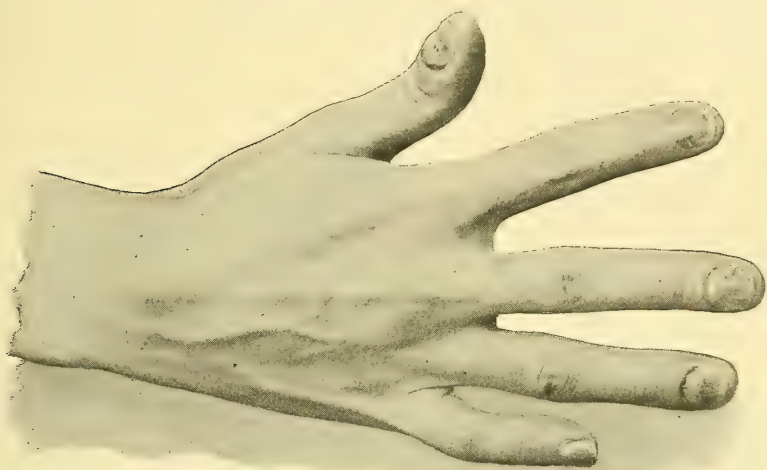
Treatment results in the gradual pushing forward of the diseased portion, leaving a healthy nail. In neglected cases, especially if the parts are irritated, the whole of the affected nail may be lifted off or pushed forward by a new nail, which may at first be imperfect.

There is also an *hypertrophic onychia*, in which the thickening of the nail is excessive. It involves the nails of the fingers more frequently

than those of the toes, and usually attacks more than one nail. He thinks women are more subject to it than men. This hypertrophic state is well shown on the nail of the thumb in Fig. 210.

There is also an affection of the nails, of which I have seen several well-marked instances in men suffering with syphilitic cachexia, which seems to be a *local necrosis*. The nail becomes opaque and whitish, in

FIG. 210.



Dry onychia.

spots the size of a pinhead. These spots, of which there may be from two or three to ten, are formed by depressions of the surface of the nail, which finally reach the matrix, leaving minute and sharply-cut holes. In some cases the necrosis is superficial, and the whole thickness of the nail is not perforated. When this occurs the nail presents much the appearance of the roughened surface of a thimble.

*Separation of the nail* takes place not infrequently in the early part of the secondary stage of syphilis, and may be partial or complete. The process may be so insidious and it may cause so little inconvenience, especially with careless persons and when the toe-nails are affected, that several nails may fall without attracting the notice of the patient. It begins at the free border of the nail, being limited at first to a portion of its breadth (Fig. 211).

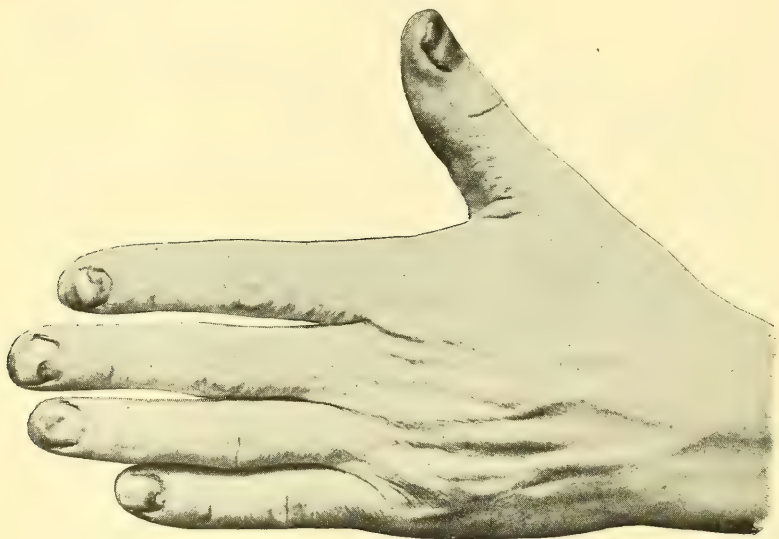
It gradually extends toward the base of the nail, involving one-third to one-half its length, and possibly its entire breadth. In neglected cases the whole nail may be affected and thrown off. The diseased portion of the nail assumes a greenish-brown color, and the matrix beneath presents more or less healthy granulations. When the destruction of the nail has been partial the healthy portion pushes forward and covers the denuded parts; when it has been complete, an entirely new nail is formed. Only one nail may be affected, or several may be involved simultaneously or in succession, those of the hands more frequently than those of the feet. (See Fig. 211.)



There are three forms of *perionychia*—an ulcerative, an indolent form which is usually non-ulcerative, and a diffuse form.

The *non-ulcerative* form may attack the entire attached margin of the nail or its lunula or one of its lateral margins. The border of the nail, to the width of about one line, is thickened in consequence of specific infiltration, and there is a more or less complete papular rim around it. The color is dull red, which pales on pressure, and the surface is slightly scaly. This condition may persist for a long time, until the nail becomes of a dull color and is traversed by shallow transverse furrows, showing

FIG. 211.



Separation of the nails.

impaired nutrition. As a result of pressure or irritation ulceration may occur at the angle of reflection of the skin, and may extend beneath the nail, which is finally loosened and thrown off. Sometimes, when only a lateral margin is affected, the ulceration reaches but a short distance, and the nail remains and excites a chronic suppurative inflammation, which is cured only after its partial or complete ablation. In two well-marked forms the first is chronic and subacute, and the second is of rapid invasion and of diffuse extent.

*Ulcerative perionychia* occurs at any time during the secondary period, and varies greatly in severity. It may begin as a papule or a pustule at some part of the nail-margin, or a small ulceration or fissure at the lunula is the change first noticed. In either case the inflammation gradually increases, and ulceration extends along the sulcus at the attached margin of the nail. The process may be limited to the lunula or to a portion of the nail-border, or it may involve the entire length of the sulcus. When the lunula is invaded the affection is very obstinate; the base of

the nail soon loses its transparency and becomes detached to the extent of about a line. The ulceration, which extends under the nail itself, and may be for a time inaccessible, constantly secretes an offensive pus. The whole nail may be gradually undermined, or the parts may be denuded to a limited extent by destruction of the attached margin. Much depends on the early treatment of the ulceration: if it be speedily checked, a new nail forms and covers the diseased parts, pushing the old nail before it.

When the ulceration, which is likely to be particularly intense at the lunula, is severe, the whole matrix becomes involved, and after the nail has been thrown off it presents a yellowish, somewhat pultaceous surface, surrounded by the swollen and ulcerated nail-margin. Soon the ulceration shows a tendency to localize itself at the basal margin, while the surface of the matrix becomes covered with a dirty-yellow, firm, and uneven epithelial tissue. Unless ulceration involves the lateral margins, which it seldom does, a thin spicula of nail forms along the whole length of the sulcus. In such a typical case the whole phalanx is swollen and bulbous, and the matrix is hypertrophied, pulpy, and of a reddish-yellow color. Attempts at formation of a new nail are seen upon the matrix and at its margins. Owing to its dense structure the matrix itself is very resistant, and if left without treatment it becomes thickened as the ulceration increases.

If the base of the nail has not been too extensively destroyed, it retains a surprising degree of reparative power. A new nail appears and covers the matrix, unless it be excessively hypertrophied, and may be quite as good as the original nail. In some cases a perfect nail results only after several renewals. It sometimes happens that the nail-producing power of the distal portion of the matrix is impaired, so that the new nail fails to cover as much of the finger as did its predecessor. When this condition coexists with total destruction of the base the whole matrix is converted into a cicatrix.

When the inflammation attacks the base and one side of the nail, it involves the subjacent matrix, and if its intensity in the latter region equals that at the base, separation of the nail at the side soon takes place, and permits the free application of remedies. Such cases are of much less gravity.

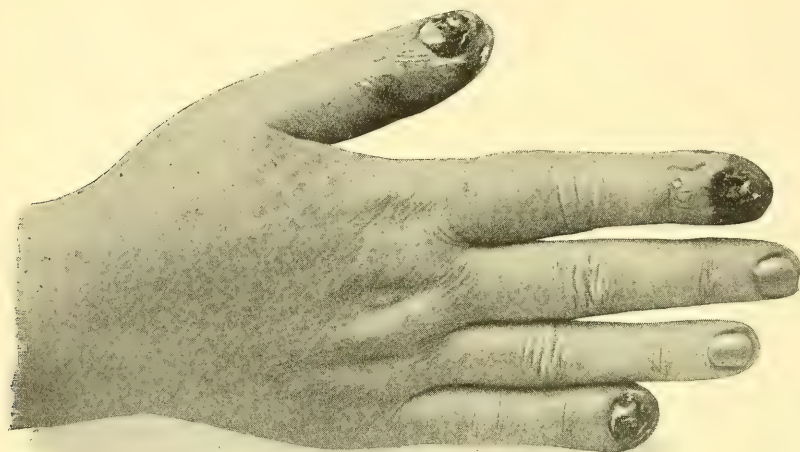
In persons whose hands are exposed to irritants perionychia may begin under the free edge of the nail, generally of the index or middle finger. Slight pain attracts the attention of the patient, and he finds a brownish-red crust beneath the nail, removal of which exposes an ulcer extending along more or less of the nail's breadth. On removal of the irritation and the use of proper remedies the ulcer soon heals; in case of neglect it extends, and rapidly involves the whole of the matrix, or it creeps slowly along, the nail assuming a dull, yellowish-brown color, the matrix exhibiting a yellow, ulcerated appearance, and the whole phalanx becoming enlarged until the base of the nail is reached, when a condition similar to that of inflammation of the lunular region is induced.

The third or *diffuse* form of perionychia begins as a hyperæmia which is bright, diffuse, and not limited to the nail. For two or three weeks the case may present simply a reddened condition of the distal

portion of the affected fingers. There may be no pain at first. In this very subacute manner the bright red deepens into a coppery hue, and the affected parts become swollen and bulbous or of the shape of an Indian club, due to syphilitic inflammation and infiltration. Coincidentally with the intensification of the disease the nails become affected and are destroyed, seemingly as if struck by a blight.

This rapid necrosis is peculiar to this form of perionychia. The nail first loses its color, which becomes dull and dark, then its attachment at each border gives way first, and after that in its whole extent, ulceration with the formation of a thick, ill-smelling pus taking place beneath it. The nail then rapidly becomes considerably swollen, uneven, and puckered, and of a black and green color, well shown in Fig. 212.

FIG. 212.



Diffuse perionychia.

With the onset of the nail-affections pain becomes an important element in the case, and the fingers are then useless for any function. The imbedded portion of these appendages is the one which gives the most trouble. Here the destructive process is usually not sufficiently great to cause the spontaneous extrusion of the nail, and this sequestrum remains, causing severe pain, acting as a foreign body, and keeping up the ulcerative process. Frequently in these cases so severe is the inflammation that the forearm and arm become red, swollen, and painful, with sympathetic implication of the axillary glands, attended by high fever, malaise, and much suffering. This lymphangitis is observed in some cases. When, however, the dead nail is removed and appropriate treatment is adopted, the coppery-red phalanx loses its tension, becomes superficially wrinkled, and of a purplish-red color. The ulcerated surface left by the fall of the nail becomes less anfractuous, and healthy granulations spring up. Then from the basal sulcus in a few months, usually about two, the encroaching end of a new nail shows itself, and it progresses in a more or less perfect manner until finally the whole nail-matrix is covered. Frequently the new nail at first is wrinkled



and far less comely than its predecessor, but under favorable circumstances it gradually becomes normal. In severe and uncared-for cases the matrix of the nail is entirely destroyed, and then no new nail is formed. This result is often seen when the intensity of the ulceration is spent at the basal portion of the lunula.

All forms of syphilitic perionychia are very chronic, rarely lasting less than one or two months, and sometimes continuing a year. At first they may cause scarcely any inconvenience, and for this reason they are often neglected.

The nails of the fingers and of the toes are attacked with equal frequency, those most used and most exposed being the most liable. In general, only one finger is affected, sometimes a finger of each hand, or two fingers of the same hand, either simultaneously or, more commonly, in succession. In many cases several or all the nails become affected.

**Diagnosis.**—Chronic eczema and psoriasis of the hand are sometimes followed by changes in the nail similar to those of syphilitic friable onychia. The question may be settled by the previous history of the case.

I have seen two cases of separation of the nail, in every particular similar to that produced by syphilis, in which that infection did not exist.

Ulcerative perionychia has been mistaken for the initial lesion of syphilis.

A chancre of the finger is seldom met with except in the case of midwives and surgeons, and is always accompanied by characteristic enlargement of the epitrochlear or axillary ganglia.

Severe perionychia resembling the syphilitic form is sometimes seen in broken-down and cachectic subjects. Its occurrence should always excite the suspicion of syphilis.

The **prognosis** of friable and of hypertrophic onychia is good, since its course is generally mild and transient. The same is true when separation of the nail occurs, the morbid condition being soon relieved by proper treatment.

The non-ulcerative form of perionychia usually distresses the patient on account of its attacking several nails, but it occasions slight inconvenience and is readily cured.

The ulcerative forms are always troublesome and often very painful affections, and the prognosis should always be guarded. The earlier separation of the nail occurs and the focus of disease at the base of the nail is reached by local applications, the sooner may relief be expected. New and comely nails sometimes develop even after prolonged and intense basal ulceration. In nearly all cases where the perionychia is lateral or at the free border of the nail a perfect nail may be predicted.

The growth of the new nail is very slow, and the spiculae at the edges and the uneven plates which often form on the surface of the matrix are important indications of retention of the nail-producing power. The new nail is often imperfect at first, being ridged and irregular, and it is sometimes permanently shorter than the old one.

**Treatment.**—Active internal treatment is required in all forms of syphilitic affections of the nails.

Friable onychia calls for no other local treatment than careful trimming of the nails and prevention of irritation. The severe forms of dry onychia are often very intractable, and require active local treatment. The fingers should be soaked twice daily in hot bichloride solution (1 : 2000), and mercurial ointment should be well rubbed in and kept on the parts.

In case of separation of the nail exposure of the matrix and the application every day or two of liquor potassæ, followed by the use of an ointment composed of one part of mercurial and two parts of diachylon ointment, will arrest the disease. The simple form of perionychia may be cured by the use of this ointment.

In ulcerative perionychia the diseased surface should be exposed as soon as possible, and cauterized with nitric acid or a strong solution of nitrate of silver, allaying inflammatory reaction with water dressings. Subsequently iodoform or powdered nitrate of lead may be applied, and the phalanx be enveloped in diachylon ointment. The profuse granulations of the matrix may require the use of a strong solution of caustic potassa (3j-3ij or iv). Prolonged immersion of the hand in very warm bichloride solution (1 : 2000) diminishes the swelling and removes the secretions. The application of a bandage over the ointment, India-rubber finger-stalls, or gutta-percha tissue, may serve to reduce the swelling. Care must be taken to apply the pressure gradually.

In addition, zinc and belladonna ointments or Goulard's extract may be used to meet special indications.

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## CHAPTER LXV.

### REINFECTION WITH SYPHILIS; SYPHILIS IN ELDERLY AND OLD PERSONS; AND THE IMMUNITY OF ANIMALS.

#### Reinfection with Syphilis.

As a general rule, syphilis, like small-pox, scarlet fever, measles, etc., attacks the individual but once in his lifetime. On this subject Ricord was quite explicit, and his statement is now generally known as Ricord's law.<sup>1</sup> It reads as follows: "*General Rule*.—A patient who has had for the first time an indurated chancre does not have another. It is probable that this law may have exceptions." Though it is claimed by some French authors that this law has no exceptions, a sufficient number of well-attested cases has been published to warrant the statement that in certain rare instances syphilis does attack the individual twice in his lifetime. There have been published up to date about one hundred and sixty cases of syphilitic reinfection, and it is safe to say, allowing much latitude, that not thirty of the whole number are really authentic cases.

<sup>1</sup> *Lettres sur la Syphilis*, 3d ed., Paris, 1863, p. 262.

On this subject the following cases, taken from my note-book, will, I think, throw much light. These cases were all brought to my notice for review during a long stretch of years as instances of syphilitic reinfection. In every case the history of a primary attack of syphilis was clearly made out:

1. Chancroids irritated by caustics, followed later on by an erythematous rash, due to iodide of sodium.

2. Indurated nodule of the lip in late secondary syphilis, due to the irritation of a pipe, which was followed by a sparse and annular erythematous eruption.

3. A relapsing induration of the lip of the meatus, followed by an eruption of simple impetigo of the arms and lips.

4. Inflammatory nodules of the penis, due to the *acarus scabiei*, and resembling in a measure hard chancres, followed by a generalized (strange to say, non-pruritic) papular eruption.

5. A relapsing induration (fifth year), followed by a quite general papular eczema and dry scaling eczematous eruptions of the palms, which were considered pathognomonic.

6. Mild form of Hodgkin's disease, with general adenopathy, followed by a subacute form of papular urticaria.

7. Herpes of the prepuce, much irritated by the nitrate-of-silver stick. A short time after an eruption of pityriasis versicolor was discovered and the case was pronounced syphilitic.

8. Herpes of the lip, irritated by caustics and presenting a nodular consistence, was followed by a generalized psoriasis of the trunk and arms in an old syphilitic.

9. A relapsing induration, followed by a lichenoid rash, due to heat and salt-water bathing. Later on a serpiginous syphilide.

10. An indurated follicle of the free end of the prepuce (gonorrhœal), and pityriasis rosea et annulata of the trunk and arms.

Many other instances could be cited, but the foregoing are sufficient to indicate in a general way the comparative frequency, as well as the sources of error in this subject. One point has struck me very forcibly, and that is that the smallest amount of adenopathy, if indeed any exists, in a given case is regarded by many physicians, when in association with a genital lesion, as satisfactory evidence of a second infection with syphilis.

The great source of error on this subject is to be attributed to the relapsing indurations, which unalterably convince many men that they have a second hard chancre before them. As the knowledge of these lesions becomes more clear and extended there will be fewer reported cases of second infection with syphilis.

Hudelo<sup>1</sup> has submitted all the reported cases (to 1891) of syphilitic reinfection to a rigid analysis, and has rejected all except those reported by the following authors: Delestre,<sup>2</sup> Gascoyen<sup>3</sup> (second case), Caspary<sup>4</sup> (second case), R. W. Taylor<sup>5</sup> (1877), Pellizzari,<sup>6</sup> R. W. Taylor<sup>7</sup> (1883 and 1885), Hutchinson,<sup>8</sup> and R. W. Taylor<sup>9</sup> (1890).

<sup>1</sup> "De l'Immunity syphilitique," *Annales de Derm. et de Syphil.*, 1891, pp. 353 and 470.

<sup>2</sup> *Moniteur des Sciences médicales*, Jan. 14, 1860.

<sup>3</sup> *Med. Times and Gazette*, Dec. 5, 1874.

<sup>5</sup> *Archives of Dermatology*, 1877, p. 119 et seq.

<sup>7</sup> *Transactions of Amer. Dermat. Association*, p. 35, 1885, and *Journal of Cut. and Ven.*

*Diseases*, 1882 and 1883, p. 205.

<sup>8</sup> *Syphilis*, chap. xv. p. 466 et seq.

<sup>9</sup> *Jour. of Cutan. and Gen.-urin. Diseases*, 1890, vol. viii. p. 457.

<sup>4</sup> *Deut. med. Wochenschrift*, No. 7, 1875.

<sup>6</sup> *Lo Sperimentale*, March, 1882.



With very many exceptions and much reservation we must admit, therefore, that true second attacks of syphilis occur, but that they are very rare. All suspected and putative cases should be approached with caution and reserve, rather than with a sanguine and credulous spirit. We need much further light on this important subject, and scientific evidence can only be obtained by a rigid examination and study of each case. Before a given case shall be accepted as true and beyond controversy the following facts must be established as clearly as possible: In the first attack, the existence of a true hard chancre followed by characteristic adenopathies and a clear history of the secondary stage and its lesions, and perhaps of a tertiary stage. Then a sufficiently long period of time should elapse in order to show that the diathesis has become extinct. Many cases have been reported in which one, two, or three years only have elapsed between the two so-called separate attacks of syphilis. Such cases are without doubt apocryphal. In the light of the cases already published it is not too much to say that no case is worthy of consideration in which the interval between the cure or apparent cessation of the first attack and the onset of the second one is at least not under five or six years. Very long intervals will inspire one with moderate credulity.

The further requirements are that the history and characteristics of the second chancre shall be satisfactorily made clear, and the involvement of the ganglia established beyond a doubt. Then a clear clinical picture of the period of general manifestations must be given before we accept the case as one of second infection with syphilis. If these requirements are fulfilled, it is safe to say that in the future we shall not be favored, as we have of late about once in two or three months, with a new case of syphilitic reinfection.

It is stated by a number of writers that second attacks of syphilis run a very mild course. Since this statement is largely based upon the features offered by apocryphal cases, it is not worthy of consideration. In my five cases the second attack was very severe, and in two instances it ended quite promptly in death. It is unwise, however, to draw conclusions from a few cases; therefore it is well to wait for future observations as to the intensity of the course of cases of second infection with syphilis.

### **Syphilis contracted at Late Periods of Life.**

It may be stated, as a quite well-recognized fact, that syphilis contracted at and beyond the fiftieth year of life is more severe than at earlier periods. This condition is particularly noticeable in previously debilitated and intemperate persons, and especially so in patients of the lower walks of life who have neither good habits, good food, nor good surroundings. Syphilis as observed in the aged has been well studied, more particularly, by Quinquaud and Ullmann<sup>1</sup> and Rénault,<sup>2</sup> whose conclusions are largely in accord with my own on this subject.

In general, the first period of incubation of the chancre is quite long.

<sup>1</sup> "Étude clinique sur la Syphilis des Vieillards," *Annales de Derm. et de Syphil.*, 1881, pp. 247, and 502.

<sup>2</sup> "Étude sur la Syphilis contractée à un Age avancé," *ibid.*, 1889, pp. 165, 288, and 428.

The initial lesion is not usually exuberantly large and indurated, but more commonly slight in character, parchment-like in thickness, with a tendency to superficial necrosis and sloughing. In some cases gangrene and phagedena are observed. The inguinal adenopathies usually appear later and develop slowly, and the swollen ganglia are very rarely, if ever, very large and nodular. The second period of incubation is also usually quite prolonged, so that two, two and a half, and even three months or longer may elapse between the appearance of the chancre and the onset of general manifestations. Quinquaud truly says that "syphilis acquired after sixty years of age is a drama, the successive stages of which are slower in their evolution than those of syphilis acquired in early life."

Secondary lesions of the skin and mucous membrane do not present that amount of hyperæmia and exuberance which may be seen in the same affections in early life. The skin lesions may be generally distributed, and perhaps more or less confluent, but they always show more or less evidence of senectitude. This is especially well shown in the erythematous and papular syphilides. Then these lesions show a marked tendency to remain in an indolent condition, and are frequently very rebellious to treatment. Further than this, they show an exasperating tendency to relapse even when a vigorous treatment is being followed.

It is not uncommon to see secondary and tertiary skin lesions commingled. Thus, roseola papules and gummatous nodules, the latter showing a tendency to break down and suppurate, may not uncommonly be seen scattered over the integument of elderly persons.

Malignant precocious lesions of the skin, bones, and mucous membranes are not at all uncommon, some of which show a tendency to gangrene and necrosis.

Quite early in the secondary stage nervous and psychical troubles with paralysis are not uncommon, and headache, neuralgic and rheumatoid pains, may also be complained of. Cerebral accidents, with symptoms resembling typhoid fever, may also be observed.

Quinquaud lays stress on the occurrence of gummatous infiltration into the ganglia, which may undergo degeneration in old persons.

Another marked feature of syphilis in the aged is the multiplicity of the tissues and organs attacked at the same time, such as the skin, mucous membranes, bone, viscera, and the cerebro-spinal axis.

Quinquaud noticed that after seventy years of age the pharynx is rarely attacked, that the brain and scalp are usually unaffected, and that the gums are more free from mercurial action than in earlier years.

All these significant facts concerning syphilis contracted late in life should be clearly borne in mind, and a more than usual watchful care should be exercised over these venerable patients. It is well to emphasize the fact, however, that in some old persons of both sexes syphilis runs a tolerably mild course, and is measurably amenable to treatment. Consequently, it is not well to always give a gloomy prognosis in these cases.

On account of its rarity, it is well to mention the case reported by Cohn.<sup>1</sup> It was that of a virile man who at eighty years of age contracted syphilis, which, though severe, was cured by specific treatment. It is said that the veteran is now enjoying good health.

<sup>1</sup> *Dermat. Zeitschrift*, 1894, p. 435.

### The Immunity of Animals to Syphilis.

Though the opinion has long been held that animals are immune to syphilitic infection, Martineau about fifteen years ago claimed that he had communicated the disease to pigs and monkeys. Koch so utterly demolished Martineau's conclusions, and made such ridicule of his technical methods, that his inoculation-experiments went for naught.

Rebatel<sup>1</sup> made incisions into the groin of a perfectly healthy bitch, and in the cellular tissue he placed portions of a fresh hard chancre, and then closed the wound. There was an ephemeral swelling of the parts, but in a few days nothing abnormal was to be seen. No glandular swelling occurred in a period of many months. He also injected 150 grammes of defibrinated blood-serum from a patient with active syphilis into the jugular vein of a young dog, without any effect whatever. These animals subsequently procreated healthy offspring.

Köbner<sup>2</sup> was successful in inoculating rabbits with chancroidal pus, but he failed to infect dogs and rabbits by means of inoculations with active syphilitic-bearing vehicles.

Horand and Cornevin<sup>3</sup> tried very assiduously to infect the pig with syphilis, but they reached the conclusion that the tissues of this animal are refractory to this disease.

Cognard<sup>4</sup> claimed that he had inoculated a monkey with syphilis, but his colleagues thought that he had simply produced septicæmia in that unfortunate animal.

Vittone<sup>5</sup> inoculated without success the fragments of six chancres upon rabbits, guinea-pigs, cats, and dogs.

Neumann<sup>6</sup> inoculated active syphilitic material into three apes, three rabbits, a horse, a hare, a white rat, a martin, and a cat. Though he made fifty-four inoculations in all, his experiments were uniformly unsuccessful.

Haensell<sup>7</sup> claims that he injected syphilitic products into the anterior chamber of the eyes of rabbits, and produced iritis and little nodules which appeared from twenty-five days to one and three months after the inoculation. These nodules were looked upon as gummata, and the conclusion of the experimenter was that he had produced syphilis; but there is no evidence offered of the existence of a general infection. This preliminary paper of Haensell has not, as far as I can learn, been followed by the second, which by implication we assume was promised; consequently, it may be said that the claim that animals are immune to syphilis has not as yet been disproved.

<sup>1</sup> "Récherches expérimentales sur l'Inoculation des Maladies vénériennes aux Animaux," *Lyon médical*, vol. xxxix., 1882, pp. 41 et seq.

<sup>2</sup> *Wiener med. Wochenschrift*, 1883, vol. xxxiii. pp. 897 et seq.

<sup>3</sup> *Annales de Derm. et de Syph.*, 1884, pp. 393 et seq.

<sup>4</sup> *Lyon médical*, June 8, 1884.

<sup>5</sup> *Gaz. Med. Ital. Lombard*, 1884, p. 315.

<sup>6</sup> *Wien. med. Wochenschrift*, vol. xxxiii., 1883, pp. 209 and 243.

<sup>7</sup> "Vorläufige Mittheilung über Versuche von Impf syphilis der Iris und Cornea des Kaninchen," *Arch. für Ophthalmol.*, vol. xxvii., 1881, pp. 93 et seq.



## CHAPTER LXVI.

## THE INFLUENCE OF SYPHILIS UPON, AND ITS RELATIONS TO, VARIOUS DISEASES AND MORBID CONDITIONS.

SYPHILIS may exert an influence upon various intercurrent diseases—first on those of an acute course, second on chronic diseases, and third on those of traumatic origin.

*Influence on Acute Diseases.*—Very little is known, beyond a few isolated facts, as to its influence on acute diseases. Bamberger and Frömmüller speak of the transformation of variola-pustules into syphilitic ulcers and tubercles in infected subjects, and Lancereaux thinks that in an epidemic of small-pox observed by him there were more cases of the hemorrhagic variety in syphilitic patients than in those not infected with syphilis. In an epidemic of scarlet fever Woakes observed a fatal result particularly in infants afflicted with hereditary syphilis. Acute rheumatism, occurring in the early months of the syphilitic diathesis, has been observed to run an exceptionally severe course and to be prone to relapse. Pneumonia, bronchitis, and pleurisy during the course of syphilis are liable to be more or less modified. Pneumonia, complicating a severe cachexia in the early months of syphilis, is a most serious accident and often leads to a fatal result. In later stages, though less malignant, these diseases are often rendered much more severe and protracted. Little can be said of the influence of syphilis upon the specific fevers. It is safe to assume that the severity of the fever will be proportionate to the gravity of the syphilitic cachexia.

## GOUT AND RHEUMATISM.

Among other important chronic diseases, gout and rheumatism are no doubt largely affected by syphilis, particularly in its late period of cachexia. It may be safely predicted that when a person subject to chronic inflammation becomes infected with syphilis he will suffer in after years from a combination of the two diseases unless treatment be most thoroughly followed. It is useless to speculate concerning the reason of this fact, but as to its being a fact we have positive evidence. Such a patient is especially liable to recurrent attacks of muscular pains, more severe at night. They come on at varying intervals, often seemingly influenced by damp and cold weather, and are seldom accompanied by febrile movement. Chronic inflammation of the fibrous tissues of the joints is especially common and persistently recurrent. Periostitis, particularly of the long bones, is common in these cases, and the development of a marked form of cachexia is especially noticeable. This cachexia is attended by all the symptoms of profound systemic depression: it may become rapidly fatal, or health may be established after a tedious convalescence, recurrences, however, being not uncommon. Some of these cases are seriously complicated by visceral affections, especially of the liver.

A gouty subject in whom syphilis, after running a chronic course, settles into a state of cachexia, presents a condition characterized by

inflammation of fibrous tissues and of joint-structures, recurring at intervals, or, in other words, a modified form of gout. Moreover, cerebral symptoms, not often congestive, but still quite formidable, are frequently present, while disturbances of respiration, of the heart, and of the stomach, referable to gout, may be manifested. The etiology of cases of this kind should be carefully studied, the subject being one of the most important in syphilography.

In patients suffering from scorbutus and the hemorrhagic diathesis syphilis has been known to be very severe. Its lesions are likely to be complicated by hemorrhage and ulceration, and a severe cachexia is not infrequent. Effusion into serous cavities often occurs, and joint-affections are peculiarly distressing.

In cases of Bright's disease syphilis usually takes a very rapid course, and has an especially adynamic influence.

### MALARIA.

Many well-authenticated observations have been made which clearly show that malaria may seriously complicate and unfavorably modify early and late syphilis. Lepers<sup>1</sup> has studied this subject, having as his basis 25 cases, and he concludes that a morbid symbiosis is produced which results in grave cachexia and perhaps visceral diseases.

Patients with an hereditary or an acquired predisposition to nervous diseases are, after infection, especially liable to syphilitic affections of the brain and nerves.

### TRAUMATISMS.

The question of the influence of syphilis upon traumatism is one of much surgical importance. In the same line the question of the expediency or propriety of performing operations on syphilitic subjects is also worthy of consideration. Though much has been written on these subjects, the essential facts can be presented with much brevity.

Both questions hinge upon three important points—namely, first, the grade of severity and activity of the syphilitic infection; second, the antiseptic care which is given to a traumatism; and, third, the asepsis and antiseptis which are employed in operations upon syphilitics.

On consulting the various brochures upon traumatism and syphilis it will be found that the parts injured were active syphilitic lesions or were lesions of continuity in syphilitic subjects. As a result of the damage inflicted on the tissues, ulceration was produced which was really due to the action of extraneous pyogenic microbes upon a favorable syphilitic soil. The logical inference is, that where syphilitic lesions are submitted to traumatism thorough antiseptic measures should be adopted to prevent ulceration.

In these days of rigid antiseptis it is very rare indeed to hear of an operation failing by reason of the syphilitic condition of the patient. Except in very much broken-down subjects operations on syphilitics can be performed with nearly as much success as upon non-syphilitics, provided the wound is aseptic. In any cases of prospective operations, particularly of major ones, it is well to institute an efficient antisymphilitic

<sup>1</sup> "Syphilis et Paludisme," *Thèse de Lille*, 1889.

treatment, and to improve the general condition of the patient as much as possible.

In all countries where syphilis has existed for many years its course is much less severe than it was originally, and the disease of to-day is really mild in comparison with what it was when first observed in Europe. It is well established that syphilis is especially malignant when appearing for the first time in a community. Numerous instances are recorded of the frightful ravages produced by it under such circumstances. The initial lesions are said to have been phagedenic, and to have been followed by severe secondary symptoms, while necroses and visceral lesions were almost invariable and precocious. This malignancy gradually diminishes in successive generations until a comparatively mild form of the disease is established. It seems that a certain protective influence is secured to progeny by the occurrence of syphilis in their ancestors, which, although not conferring absolute immunity, decidedly modifies the course of the disease. Thus our ideas of the nature of syphilis are free from that fear with which our forefathers were accustomed to regard it, and we no longer look upon it as an incurable disease.

Various circumstances have contributed to this change. Undoubtedly, the progress of civilization has been of signal influence in establishing improved hygienic and sanitary conditions. Thus the standard of nutrition has been raised and the ability to resist disease increased. In our own country the people of the poorer classes are in general better nourished and better cared for than in many European communities. It thus happens that among us scrofula, rickets, and other adynamic conditions are much less frequent than abroad.

Another potent influence in lessening the severity of syphilis is found in our improved knowledge of its treatment. Within the past twenty years great advances have been made in the therapeutics of this disease. Many errors have been eliminated, and new principles have been established on a more correct basis.

The severity of syphilis is largely modified by the constitution and temperament of the patient. As a rule, in persons of good health and habits its course is mild, and, provided treatment be followed, it becomes extinct in a few years. It is likely to be more severe in persons of light complexion and reddish hair, and who have a nervous temperament, than in those of dark complexion.

Syphilis affects persons variously at different ages. The hereditary disease is often very malignant, but acquired syphilis in children is usually not remarkably severe. About the age of puberty the lesions of syphilis are apt to be very extensive, and the consequent impairment of nutrition very great. In females its course is generally severe, especially at puberty. After maturity the constitution is less affected, and, fortunately, the disease is most often contracted at this period, when the vital processes are most active and the powers of resistance most energetic.

It is obviously difficult to determine positively whether the severity of syphilis depends or not on the intensity of the infecting poison. It would certainly seem very natural that virus from a recent and active syphilis is likely to produce an intense form of the disease, and *vice versa*, but we have no facts to confirm the opinion. On the other hand, we



often see two patients, who derive their disease from the same source, presenting one a mild and the other a severe form of syphilis. We are therefore warranted in believing that the constitution of the patient has much more influence in shaping the character of his disease than the quality of the virus absorbed. With rare exceptions the severity of the disease is in proportion to the general health of the patient. Persons in whom the process of metabolism is weak, and who are of poor fibre and flabby structure, are particularly liable to active and prolonged attacks of syphilis. They exhibit an especial tendency to ulceration and destruction of tissue. The debility and impaired nutrition left by the continued fevers, diphtheria, and other exhausting diseases have a very unfavorable influence on the course of syphilis. Alcoholism seems to increase the gravity of the cachexia and the destructive tendencies of the lesions. It is in alcoholic cases that we meet with many of the instances of malignant syphilis called by the French "*galloping*" (*syphilis gallopante*).

As we have already observed, the course of syphilis is in a great measure governed by the treatment. If the use of mercurials be begun early and carefully continued, even in those whose constitution is not very good, the disease may be cured, if we may be allowed to assume a person cured who for years is equally as healthy as an uninfected individual, and who presents no manifestations of the disease and propagates healthy children. The majority of authorities now hold the opinion that syphilis is a curable disease. In this I concur, and I believe it right to promise any patient, whose health is not seriously undermined by some other disease, that he may expect complete recovery by undergoing treatment for the first three years of his disease and by paying ordinary attention to hygiene. The importance of the early use of mercury after the development of secondary lesions cannot be overestimated. A far better effect is secured than if its use is postponed. In my experience tertiary lesions have been almost unknown where the disease has been gradually and carefully treated from the outset. In the vast majority of cases of tertiary syphilis under my care for many years the histories showed neglect or inadequacy of treatment, and in many of them the iodide of potassium had been relied upon during the first year, when mercury should almost always be given.

#### VULNERABILITY OF THE SKIN AND MUCOUS MEMBRANES.

In the early stages of syphilis the skin and mucous membranes are peculiarly susceptible to inflammation; the tendency becomes less marked as the diathesis grows older. It is greater in some subjects than in others, those having a delicate white skin possessing it more decidedly. The integument of those who have had pustular and ulcerating syphilides is more liable to become inflamed from a slight cause than that of those who have had erythematous and papular rashes. This altered condition of the skin and mucous membranes is seen in its most simple form in the extreme inflammation attending slight cuts and abrasions, and in a greater degree in the excessive ulceration and suppuration during the course of certain non-specific skin diseases, such as acne, eczema, impetigo, and pemphigus. It is also strikingly seen in the tendency shown by some patients to the development of boils. Some patients in the secondary

stage of syphilis, and even later, are attacked by inflammatory nodulations and boils at the back of the neck and at the nucha.

Irritation of the skin of syphilitics may also cause infiltration with or without ulceration. A splinter of wood imbedded in the skin has been known to give rise to a tubercle having all the appearance and character of a specific lesion. In many cases of artificially produced ulceration infiltration coexists, and remains long after cessation of the destructive process. Wounds, bruises, and ulcers are liable to become complicated by this nodular infiltration. This tendency to infiltration ceases with the extinction of the syphilitic diathesis, whereas the tendency to ulceration persists long after the completion of cure. This fact is exemplified in the ulcerations and fissures occurring in the mouths of smokers when syphilitic manifestations have long since disappeared.

This peculiar condition of the skin is worthy of special consideration in connection with the serpiginous syphilides. These creeping ulcers undoubtedly originate in true syphilitic lesions, but the decided absence of characteristic features in their future course warrants the suspicion that they become simple chronic ulcers developed upon a favorable soil.

The fact that during syphilis slight abrasions and herpetic vesicles may give rise to ulcers resembling chancreoids is of great practical importance, and its thorough recognition will enable the physician to avoid doing injustice to innocent persons.

### Syphilis and Tuberculosis.

Syphilis in its early and later stages induces in the tissues a condition which is favorable to the development of tuberculosis, and it becomes a factor of greater or less gravity. This remarkable symbiosis is one of the most frequent and far-reaching morbid states to which the human race is liable. Succinctly stated, the tubercular bacillus takes root, fructifies, and luxuriates in some syphilitic individuals who seem to be peculiarly predisposed to this malignant combination. One of the gravest dangers—and, fortunately, not of the commonest—of syphilis in some subjects is the development of pulmonary tuberculosis. In some cases, early in the secondary stage the patient begins to lose ground, becomes thin, coughs, and rapidly passes into tuberculosis, which promptly ends in death. In other cases the mixed infection runs on slowly, and several months may elapse before death ensues. Besides these lethal cases we see some later in the disease in which there is evidence of mild and localized pulmonary tuberculosis, which may, under favorable climatic conditions, become cured. Even in the tertiary stage this morbid predisposition exists in some cases, and leads to chronic pulmonary tuberculosis and death.

In this connection it is well to mention that Saalfeld<sup>1</sup> has published an interesting and clinically well-observed case in which he made a careful microscopical study of the post-mortem specimens.

As might be expected from their exposed positions, the syphilitic eruptions of the skin are liable to be attacked by the bacillus of tuberculosis.<sup>2</sup> Neisser has reported an interesting case of mixed tubercular

<sup>1</sup> "Die Lungensyphilis und ihre Verhältniss zur Tuberculose," *Berl. klin. Wochenschrift*, 1894, No. 15, pp. 657 et seq.

<sup>2</sup> "Fall von Mischinfection von Lupus und Tubero-serpiginösem Syphilid.," *Seperat Abdruck aus der Verhandlungen des iv. Deut. Dermat. Congresses*, 1894.

and syphilitic infection in a case of serpiginous syphilide, in which he details his microscopical findings.

In the tertiary stage of syphilis the coexistence of tubercular inflammation with gummatous infiltration is very common. This is well shown in the numerous carefully-made autopsies of cases of visceral syphilis within the past ten years, in which the details of the mixed and complicating morbid changes are well brought out. The syphilitically inflamed and infiltrated bones, fasciæ, joints, and tendinous sheaths are in some cases especially prone to become the seat of tubercular inflammation. I have seen two well-marked instances of tertiary syphilitic orchitis in which the testes were attacked by tuberculosis, which also involved some of the viscera. In one case death was produced, and in the second a salubrious climate and treatment produced a restoration of the patient's health.

Fabry<sup>1</sup> reports a case of great interest in this line of thought. It was that of a man who suffered from chronic syphilis, and who presented a gummatous ulcer of the prepuce, which was attacked by tuberculosis. This lesion was found by Fabry to be a mixed tubercular and syphilitic process, which he clearly demonstrates by a micro-photograph.

### Syphilis and Cancer.

Syphilis is in no sense of the term an etiological factor in the development of cancer, but in some cases it acts as the forerunner and the predisposing cause of the latter disease by means of the chronic irritative processes which it establishes. As a rule, cancer consecutive to syphilitic processes develops in the mouth, particularly on the tongue and near its muco-cutaneous junctions. It may also appear on the skin proper, following certain chronic inflammatory syphilitic processes. As a result, a hybrid disease is produced, usually in the tertiary, and exceptionally in the late secondary, period of syphilis.

As cancer appears in the mouth and upon the tongue, the clinical division of its symptomatology of Ozenne<sup>2</sup> is in my judgment worthy of acceptance. This observer makes three classes of syphilis-cancer of the mouth—namely, cancero-sclerous, cancero-gummatous, and cancero-sclero-gummatous.

In cancero-sclerous glossitis the tongue is usually for a long time the seat of chronic syphilitic inflammation. (See chapter Syphilitic Scleroglossitis.) The organ is enlarged, superficially infiltrated, covered with a thick layer of epithelium, with nodules or plaques of greater or less hardness. There may be interstitial nodules seated in the substance of the tongue, which are usually quite hard, sometimes very well defined, and again merging imperceptibly into the surrounding tissues. In some cases it is very difficult to determine which is the cancerous nodule and which the mass of sclerous glossitis. In some cases, instead of enlargement of the tongue, there is distinct atrophy, and then we may find deep-seated nodules or superficially exulcerated lumps on the dorsum or at the sides of the tongue. Then, again, the morbid new growths may be seated

<sup>1</sup> "Ueber einen Mischfall von lues und tuberculose seltener Localization, etc.," *Arch. für Derm. und Syph.*, vol. xxv., 1893, pp. 925 et seq.

<sup>2</sup> "Du Cancer chez les Syphilitiques: de l'hybridité cancero-syphilitique de la cavité buccale en particulier," *Thèse de Paris*, 1884.



on the superficial parts of the organ in the shape of hard, angry-looking, perhaps papillomatous plaques. In all these instances there is much epithelial hyperplasia and many shallow or deep fissures on the dorsum and at the sides of the tongue, together with exulcerated and perhaps deeply ulcerated patches. In these cases the chronicity of the morbid process, together with the well-marked swelling of the glands under the jaw, should tend to excite a suspicion of malignant disease.

Cancero-gummatous glossitis begins, as a rule, insidiously. There may or may not be epithelial hyperplasia. A nodule first forms, either deeply in the substance and near the centre of the tongue or near its edge, but more commonly near or on the sides. This lesion is the gumma, which under active treatment may undergo absorption. It may, however, from neglect, break down, and then remain as a deep, foul ulcer, the periphery of which may undergo cancerous degeneration. This is the usual clinical history of cases of canbero-gummatous glossitis. As a rule, the glands become much enlarged, and in spite of surgical intervention the cancer extends and causes the patient's death.

In exceptional cases the hybrid morbid condition causes the tongue to become exceedingly large.

Cancero-sclero-gummatous glossitis offers in its clinical picture a combination of the foregoing two forms of degeneration. In any of these forms, by means of extension of the morbid process, the tonsils, the cheek, and the lips may be attacked. Pain in varying degree is a special feature in these cases, particularly in their late stages.

Other points of the mouth—namely, the hard palate and the floor—may also be thus attacked.

Lang<sup>1</sup> reports, together with microscopical findings, two cases of syphilis-cancer of the lip and one of the floor of the mouth.

Doutrelepon<sup>2</sup> has reported a case of serpiginous syphilide of the cheek which gave rise to epitheliomatous degeneration. Lang reports a similar case, and I observed a case in which the syphilide, having travelled well over the trunk, caused an enormous epitheliomatous growth upon the hypogastric region. Doutrelepon also records the case of a woman having an ulcer of the labia majora which underwent similar degeneration. Many years ago I had under my care a case of old syphilis in a woman who had had much hyperplasia of the anal region, which underwent cancerous degeneration and then extended to the genital parts. Doutrelepon also speaks of a case in which a warty growth of the lower eyelid in an old syphilitic became cancerous. I have further seen three cases of cancer of the tongue, one of the lower lip, one at the right labial commissure, and one upon the hard palate, all of which followed chronic syphilitic inflammatory processes. It follows, therefore, that these old and persistent syphilitic processes should be carefully attended to and cured.

There is further one point which should never be forgotten—namely, that when a syphilitic lesion in any of the localities mentioned shows evidence of chronicity and exuberant growth, particularly if warty, papillomatous, or nodular, the surgeon should be on the watch for cancerous degeneration.

<sup>1</sup> "Ueber Combination von Syphilis und Krebs," *Wien. med. Blätter*, Nos. 41 and 42, 1886, and No. 10, 1888.

<sup>2</sup> "Syphilis und Carcinoma," *Deut. med. Wochensch.*, 1887, No. 47, p. 1016.

Murzin<sup>1</sup> details the case of a man syphilitic for fourteen years who presented a nodule of the ala nasi which was removed, and under the microscope the tissue was found to be a gumma transformed into an epithelioma.

### Syphilis and Aneurysm.

Within the past twenty years the conviction has been growing in the medical mind that syphilis is an active and frequent factor in the production of aneurysms. This view, at first based on clinical observations, has since been confirmed and strengthened by the results of microscopical studies. With the expansion of our knowledge of the pathology of syphilis the fact that this infection in its whole course largely attacks the blood-vessels has called particular attention to it as a prime cause of aneurysm. The first authoritative essay, according to my reading, on the subject was read by an English army surgeon, Mr. F. J. Welch,<sup>2</sup> before the Royal Medical and Chirurgical Society of London. In 117 cases of aneurysm in soldiers, Welch found that 46.1 per cent. occurred in syphilitic subjects; 6.8 per cent. in subjects probably syphilitic; 21.3 per cent. in phthisical subjects; 14.2 per cent. without determinate cause; 5.9 per cent. with heart disease; and 6.7 per cent. with various other diseases.

While it may be urged that these statistics may not be wholly accurate, they are nevertheless important in establishing the fact of the frequency of occurrence of aneurysm in syphilitic subjects.

The aorta is the vessel most frequently attacked, but the radial, temporal, cerebral, and popliteal arteries are also frequently involved.

Many cases have been reported, in some of which, undoubtedly, syphilis was the etiological factor. Then, again, there are cases reported in which it is difficult to eliminate the influence of trauma, gout, rheumatism, lead-poisoning, alcoholism, and arterio-sclerosis. In some cases there can be no doubt that several factors, with syphilis, were the underlying cause of the arterial degeneration.

Jaccoud<sup>3</sup> reports a case of aneurysm of the ascending aorta in a woman forty-five years old who had been syphilitic twenty years. In this case trauma, gout, lead-poisoning, and alcohol were excluded as pathogenic conditions.

Two very interesting cases have been reported by Buchwald.<sup>4</sup> The first was that of a man forty-four years old and six years syphilitic. He at first suffered from dyspnœa and dulness in the mediastinum, and dilatation of the veins of the overlying skin was observed. Later he had more severe dyspnœa, cyanosis, and compression of the bronchi. At the autopsy an aneurysm as large as a man's fist was found. For a time the man was relieved by the internal use of the iodide of potassium.

The second case was that of a man forty years of age who suffered with the usual symptoms, and was for a time relieved by treatment.

<sup>1</sup> Bolnitsch, *Gaz. Botkina*, vol. v. pp. 457 et seq.

<sup>2</sup> *Lancet*, Nov. 27, 1875, pp. 769 et seq.

<sup>3</sup> "Aortite et Aneurysme de l'Aorte d'Origine syphilitique," *La Semaine méd.*, No. 2, 1887. See also Jaccoud, *Leçons de Clin. méd. faites in l'Hôpital de la Pitié*, Paris, 1887.

<sup>4</sup> "Ueber Syphilitische Aorten-aneurysma nebst Bemerkungen über Herz-syphilis," *Deut. med. Wochenschr.*, No. 52, 1889, p. 1057.

Buchwald very properly lays stress on the fact that in these cases of aneurysm there is frequently concomitant heart- and vessel-changes.

In this connection the following case, reported by Fränkel,<sup>1</sup> is interesting: A woman thirty-six years old suffered from angina pectoris and the results of aortic insufficiency. At the autopsy the anterior coronary artery was found to be free, while the left was obliterated by sclerosis at its embouchure in the aorta. The interventricular septum contained a gumma. The sclerosis involved the aorta as far as the bifurcation of the iliac arteries.

Fränkel states that in 19 autopsies in patients who suffered from aneurysm, 9 of them were syphilitics under fifty years of age, making an average of 47 per cent. in favor of syphilis as the cause.

In considering the influence of syphilis in the causation of aneurysm it is not only necessary to bear in mind the factors already mentioned, but also the conditions of life of the patients. In soldiers there is an enforced constriction of the chest which may predispose them to aortic degeneration. In other walks of life a man's duties may require him to assume positions which may react upon the vessels of the chest.

It is necessary to remember that although tubercular complications and cancerous and aneurysmal degeneration are usually of late development, they may occur early and during the secondary period.

## CHAPTER LXVII.

### AFFECTIONS OF THE EYE.<sup>2</sup>

A LARGE number of tissues enter into the composition of the orbit and its contents, and syphilitic affections of this region are correspondingly numerous; but a minute description of all of them would be inconsistent with the limits of this work, and I shall therefore merely allude to several of them, and dwell chiefly upon those which are the most common and most likely to fall under the care of the general practitioner.

#### Affections of the Bones of the Orbit.

These may show themselves either as periostitis, caries, or necrosis. They produce the same general symptoms and appearance as in other parts of the body, but, from the very seat of the trouble and the proximity of the inflammatory action to the delicate and complex organ of the eye on the one hand and the sensorium on the other, the symptoms are apt to be graver and the results more disastrous here than elsewhere except within the cavity of the cranium itself.

<sup>1</sup> "Präparaten von Herz-syphilis," *Berl. klin. Wochenschr.*, No. 12, 1894, pp. 296 et seq.

<sup>2</sup> By the late Dr. E. G. Loring.



The inflammation is very liable to be propagated from the bony walls to the contents of the orbit, and there give rise either to a superficial or deep-seated cellulitis, which, if unchecked, may result in the formation of an abscess, and this, in its turn, may either seriously threaten the integrity of the eye or cause its total destruction. Again, sinuses may be formed in different directions in the lids or their surroundings, through which the products of inflammation may be discharged for an almost indefinite period, accompanied by ulceration and contraction of the soft parts, with eversion or displacement of the lids.

The favorite seat of these troubles is the inner portion of the orbital plate of the frontal bone, the orbital border, superior and inferior, and the os unguis, in which latter they often lead to troubles in the lachrymal passages.

The results of orbital cellulitis may be the same here as in the idiopathic form, and the surgeon must be prepared, in case a deep-seated abscess forms, to evacuate this with a bold, free incision into the orbit, in order to save the eye, or it may be the life, of the patient.

The constitutional disturbances in these affections of the bones, especially when of a chronic form, are sometimes very great, and the patient often becomes reduced in a marked degree through pain and general nervous prostration, so that the attending physician is often fearful of subjecting him to a rigorous course of specific treatment. This, I am convinced, is a mistake, for there is no occasion where the good effects of a vigorous antisypilitic course are more marked than here, as well in regard to mercury as to iodide of potassium. Very large doses of this latter drug (ʒj), two or three times a day, are indeed often the only thing which seems to effect a change for the better.

Syphilitic nodes may be met with upon either of the four walls of the orbit. They are most frequent near the anterior opening of the socket, but may occur at a greater or less depth within its cavity, and cause protrusion of the eyeball and loss of vision, consequent upon the stretching of the optic nerve.

Real exostoses may form in the bones of the orbit as the result of syphilis.

### **Affections of the Lachrymal Passages.**

Syphilis not unfrequently gives rise to changes in the lachrymal passages, causing obstruction to the flow of tears, epiphora, and lachrymal abscess and fistula. Since these passages are not exposed to direct observation, the exact nature of the changes in their walls is not always apparent. In a few instances the disease appears to be confined to the mucous membrane and submucous tissue, and to consist in catarrhal inflammation, consequent œdema, and ulceration; in the majority of cases, however, it commences in the bony wall or periosteum, and the mucous membrane is affected secondarily — changes which correspond to those met with in other mucous membranes contiguous to bony tissue. The character of the coexistent syphilitic symptoms may afford some idea of the changes in the tear-passages, which, however, can only be accurately determined by direct exploration.

The **symptoms** are sufficiently obvious. The tears, meeting with

obstruction to their transit through the lachrymal passages, collect upon the conjunctival surface; if profuse, they flow over upon the cheek, especially when the patient is exposed to the wind, and the eye is evidently more moist than its fellow, whence the name "watery eye" applied to this disease. Soon pressure over the lachrymal sac causes a reflux into the eye of the lachrymal secretion mixed with more or less purulent matter, or the same result takes place spontaneously: the conjunctiva, especially that of the lower lid and inferior portion of the globe, is maintained in a constant state of irritation and inflammation, and the puncta are abnormally red, swollen, and prominent. In extreme cases an abscess forms in the lachrymal sac or neighboring cellular tissue, opens, and gives rise to one or more fistulæ.

These affections of the lachrymal passages may occur at any period of the constitutional taint; but here, as elsewhere, the catarrhal inflammation of the mucous membrane coincides, as a rule, with the secondary stage of the disease, while the deeper-seated troubles of the periosteum and the bones are the development of the tertiary period.

Much may be done for the relief and permanent removal of obstructions of the lachrymal passages by the persevering and long-continued use of specific remedies. The bichloride of mercury and iodide of potassium may give satisfactory results. Most cases, however, refuse to yield to internal remedies alone, and in all a cure may be expedited by a resort to the improved local treatment for which ophthalmic surgery is so largely indebted to Mr. Bowman of the Moorfields Ophthalmic Hospital.<sup>1</sup>

The **treatment** consists in slitting up the canaliculi as far as the caruncle, and afterward dilating the passage into the nose by means of graduated probes, as we would a stricture of the urethra. The first part of the above procedure is often sufficient to afford great relief to the patient by opening a free communication between the conjunctiva and sac, and by preventing collections of matter in the latter or facilitating their evacuation. One or both canaliculi having been slit up, an opportunity is afforded to explore the nasal passages with a full-sized probe (about one-twentieth of an inch in diameter) and to ascertain the nature of the obstruction. If this be due to swelling of the mucous and sub-mucous tissues alone, the passage of a probe, repeated every two or three days for a few weeks, and retained on each occasion for about half an hour, will in most cases suffice to re-establish the patency of the canal; but when denuded bone can be felt, showing that the disease is seated in the periosteal or osseous tissues, Mr. Bowman's method will sometimes prove unsuccessful, and it becomes necessary to resort to the following mode of treatment: If, after the canaliculus has been slit up, explorations with a small Bowman's probe show that the seat of the trouble is in the lining membrane or periosteum of the canal, whether this be from simple thickening or from an actual stricture, then the upper canaliculus should also be slit up and the orifice made by the juncture of the two wounds enlarged, and a long slender knife, such as Agnew's<sup>2</sup>

<sup>1</sup> "See Mr. Bowman's papers in the *Medical and Chirurgical Transactions*, 1851, and in the *Ophthalmic Hospital Reports* for October, 1857; also "Remarks on Diseases of the Lachrymal Passages," by the author in the report of the N. Y. Eye Infirmary, *N. Y. Journ. of Med.*, July, 1859.

<sup>2</sup> For an admirable article on "The Treatment of Lachrymal Diseases," see the *American Practitioner*, Jan., 1871, p. 1, C. R. Agnew, M. D.

lachrymal knife, should be passed the entire length of the canal, and the membrane freely incised down to the bone. After the bleeding which relieves the congestion of the parts has ceased, the largest size of Bowman's probes should be passed so as to fully dilate the canal. This having been accomplished, it is usually a comparatively easy matter to keep the canal open by the occasional use of a smaller probe.

In long-standing chronic cases, where there is not much active inflammation, instead of a probe, a piece of lead wire of the same size as a probe may be inserted and left for a day or two, or even for a week or more, until the divided stricture and membrane have healed. Weak injections of nitrate of silver through the sac and nasal canal by means of a small syringe, such as is used for hypodermic injections, may often be used with benefit once or twice a week. These should, however, never be stronger than a grain to the ounce.

Sometimes cases occur with every appearance of a severe trouble in the sac and canal, showing a large and reddened tumefaction, which is exquisitely painful to the touch, and in which there is a slight sense of fluctuation, with every indication of confined pus. There is, however, little or no epiphora, and no pus escapes when the canaliculi are slit up. Moreover, the probe shows that there is no stricture or even narrowing of the canal. The real seat of the trouble is, then, not in the sac or canal, but in the periosteum of the nasal process of the superior maxillary bone and contiguous parts. In this case the incision should be made from the outside, and be deep enough to go through the periosteum. The cut should be kept open for a day or two, and small poultices used, for only twenty minutes or so once or twice a day. Sometimes, though rarely, we see a permanent thickening of the bones in this region, which makes a distressing deformity.

Should this treatment not suffice, it sometimes becomes necessary to resort to obliteration of the sac and canaliculi (which should always be included) by the actual cautery, or to wait for the slow elimination of the carious portions of bone under the internal administration of iodide of potassium. The old-fashioned style has been entirely abandoned. The danger and inconvenience attending its employment far more than counterbalance any benefit that can be derived from it.

### **Syphilitic Affections of the Lachrymal Gland.**

The only recorded case of affection of this gland is, according to Dr. R. W. Taylor,<sup>1</sup> that reported by Chalons<sup>2</sup> of Luxembourg: "This case was that of a person in the first year of his disease, having lesions of an exanthematous character and an iritis. Coincidentally, these glands were observed to become swollen, and their increased size was very perceptible, as they pushed the upper lids forward. The gland on the right side was much more tumefied than its fellow, and caused the eyelid, which was slightly reddened, to droop down over the eye as in the affection named ptosis. There was no pain, and the symptoms were of a mild character. The appearance of the person is described as being very peculiar. The swellings subsided under the influence of a mercurial treatment."

<sup>1</sup> *American Journal of the Medical Sciences*, vol. lxi., 1875, p. 370.

<sup>2</sup> "Adenitis Lachrymalis Syphilitica," *Preuss. Vereins Zeitung*, No. 42, 1859.



The writer has seen one or two similar cases in which inflammation of the lachrymal gland or surrounding tissue was supposed to exist. In all these cases, however, excepting one, there was no specific history and no concurrent, nor had there been any anterior, manifestations of syphilis. In one case there was a doubtful specific history in a man of forty years, and the trouble, which had lasted a long time, yielded at once to very large doses of iodide of potassium. In all the trouble was one-sided. Dr. Taylor also mentions in the same paper two unique cases where there was gummy infiltration into the caruncles.

### Syphilitic Affections of the Eyelids.

These lesions are very rare, but when they do occur they present the same general appearances and characteristics that the same lesions present in the corresponding tissues elsewhere in the body, and they may for clinical purposes be divided into eruptions, infiltrations, and ulcerations.

An eruption of a pustular syphilide, of ecthyma, of ulcerating rupia, and other forms may occur on the eyelids, and especially, according to Lancereaux, in the tertiary period the external surface of the lid may be the seat of ulcerating or even serpiginous syphilides, which by cicatricial contraction may cause ectropion or other displacements of the lid. Lawrence states that the lining mucous membrane may share in the eruption, which, as a rule, affects it superficially. He mentions a case of general papular eruption in a man with specific iritis, in whom papules were also seen on the inner surface of the lid. The writer has seen a similar case where the papules, which covered the external surface, extended a little beyond the juncture of the mucous membrane with the edge of the lid.

Syphilitic eruptions of the eyelids are more frequent in infants affected with hereditary syphilis than in adults. The external surface of the lids is the seat of an eruption of pustules, which run into each other, break, and leave the skin excoriated and red.<sup>1</sup> The conjunctiva of the lid and the globe may become involved through extension of the inflammation, and the cornea destroyed by infiltration of pus. This affection may be distinguished from ophthalmia neonatorum by its later development—the latter appearing about the third day and the former several weeks after birth—and by the presence of the eruption upon the external surface of the lids, to which the conjunctivitis is only secondary.

*Syphilitic Ulcerations.*—These may be due either to a chancre or to true syphilis, and they may be primary or secondary.

Soft chancres upon the lids are of extreme rarity. I have never seen any myself, but Galezowski<sup>2</sup> and Hirscher<sup>3</sup> have each reported a case.

In the secondary period syphilitic lesions of the inner surface of the lids appear as small, circumscribed, prominent spots, usually of a moderate degree of vascularity, though not always, as the surrounding tissue some-

<sup>1</sup> Figured by Devergie, *Clinique de la Maladie syphilitique*, Pl. 37.

<sup>2</sup> *Journal d'Ophthalmologie*, mai et juin, 1872.

<sup>3</sup> *Wiener med. Wochenschrift*, Nos. 72, 73, 74, 1866.

times becomes congested, and the congestion may then extend to the ocular conjunctiva. The color of these spots sometimes varies from a grayish-red to a yellow or even copper color. Mucous patches, pure and simple, may occur on the palpebral conjunctiva, and they present the same characteristics as they do elsewhere on the body.

Secondary ulcerations of the eyelids usually begin as gummy tumors or as submucous infiltrations. They are very destructive of tissue, and often leave behind them a scar, which, with the destruction of the hair-follicles and the consequent loss of hair, is for some a diagnostic mark. Still, the fact should not be lost sight of that the same result may occur from a simple furuncle or an aggravated styte.

Secondary ulcers are almost always situated near the free border, encroaching upon the mucous membrane or upon the skin, and sometimes, as in a number of cases collected by Mackenzie,<sup>1</sup> causing complete destruction of the lid. I have seen but one case, in a lad aged nineteen affected with syphilitic disease of the lachrymal passages and nodes upon the tibia, and who had several small excavated ulcers upon the mucous membrane of the lower lid bordering upon its free margin. His disease could be traced to a chancre contracted three years previously, and disappeared under iodide of potassium and mercurials. These ulcerations may be mistaken for ophthalmia tarsi and epithelial cancer, or, when situated near the inner canthus, for disease of the lachrymal passages.

Moreover, Zeissl declares that the gross and microscopical appearances of the initial lesion are so similar that they can hardly be distinguished, and, moreover, the rapid and enormous growth of a papule on the lid sometimes causes it to resemble a gumma.

Sometimes infiltrations into the substance of the lid between the cartilage and the external surface do not ulcerate, but remain for a long time as nodules, varying in size from a shot to a large-sized filbert. Under these circumstances the skin over these nodules is but slightly if at all reddened, and in this case these protuberances bear a close resemblance to tarsal tumors or chalaza, for which they have been mistaken. These masses usually resolve themselves under the free use of anti-syphilitic remedies, especially the mercurials.

Syphilitic inflammation of the tarsal cartilage has been reported latterly by various observers under the name of *tarsitis syphilitica* (Magawby, Fuchs, Vogel, Bull, and others). It is characterized by a thickening from inflammatory infiltration of the cartilage, which usually maintains its shape, and swelling of the lid, in which the skin may or may not be involved. As a rule, it is found that after the acute stage has passed and the tumor has disappeared the cartilage has lost its normal elasticity and resistance. The affection is very obstinate, lasting over several weeks, if not months, and it is apt to be followed by a more or less complete loss of the ciliæ.

Finally, inflammation due to constitutional syphilis may attack the tendons and fasciæ of the muscles of the globe, and especially the capsule of Tenon. This is always a grave lesion, as deep-seated abscesses are liable to form, hemmed in by the fasciæ and thecæ.

Besides constitutional **treatment**, these affections often require surgical interference in the way of deep and broad incisions into the orbit,

<sup>1</sup> *Diseases of the Eye*, Philad. ed., 1855, p. 160.

especially in the line of the muscles and close to the globe. They are apt to end, in spite of all care and skill, in total destruction of the globe through panophthalmitis.

### Affections of the Conjunctiva.

If we except the ulcerations of the lids, already described as sometimes encroaching from the mucous membrane of the internal surface upon the cul-de-sac, the conjunctiva—that is, the ocular conjunctiva—is very rarely the seat of syphilitic manifestations.

Savy,<sup>1</sup> however, reports a case of a syphilitic papule developed upon the ocular conjunctiva three millimetres above the cornea. The patient contracted syphilis six months before, and had over the whole body an obstinate lenticular eruption; the eyelids were red, the lashes had fallen off, and the papular eruption had extended to the under surface of the lids. A cure was obtained after three weeks' specific treatment. Savy quotes two similar cases from P. Horteloup and from Lailler.

Infants tainted with hereditary syphilis are, indeed, more frequently than others the subjects of ophthalmia neonatorum, to which they are peculiarly exposed from their general cachectic condition and the frequency of vaginal discharges in their syphilitic mothers; but there is no direct connection between their hereditary taint and the purulent inflammation of the conjunctiva, which usually makes its appearance before the development of other symptoms.

Mr. Smee<sup>2</sup> and Mr. France<sup>3</sup> have met with “blotches” upon the conjunctiva coinciding with syphilitic eruptions upon the integument, and disappearing under mercurial treatment. The appearances, as described by Mr. France, are as follows: “This form of disease presents itself as a limited and well-defined discoloration of the mucous membrane of the globe, which, within the affected area, is slightly thickened and raised, but not conspicuously, if at all, more vascular than the neighboring surface. There does not seem to be any disposition to ulceration, as when the margin of the lid is attacked with syphilis; there are no pain and no morbid discharge.” Mr. France met with two cases, of which he gives a plate—Mr. Smee with only one.

There would appear to be no reason why the ocular conjunctiva should not be affected both by true chancre and chancroid. I have never seen the occurrence of either, but, as this work is passing through the press. Boucheron reports a well-authenticated case of a true chancre of the semilunar fold conveyed in a kiss from mucous patches in the mouth, and refers to another in the same situation in a physician who rubbed his eye to relieve itching with his fingers soiled in examining a case of syphilis.<sup>4</sup>

I have seen several times what I have taken to be ulcerations of a secondary nature, such as have been described by Magni, Noyes,<sup>5</sup> and others. The latter says the common site for these ulcerations is near the margin of the cornea, where a reddened and elevated spot appears, resembling a severe phlyctenule. It rises higher and is more extensive than such eruptions usually are, and it soon begins to ulcerate. The surface

<sup>1</sup> “Contribution à l'Étude des Eruptions de la Conjunctive,” *Thèse de Paris*, 1876.

<sup>2</sup> *London Medical Gaz.*, 1844, pp. 347, 348.

<sup>4</sup> *Gaz. des Hôp.*, 14 juin, 1879.

<sup>3</sup> *Guy's Hosp. Repts.*, 3d Series, vol. vii.

<sup>5</sup> *Syphilis of the Eye*, 1874, p. 4.



not only becomes excavated, but shows a jelly-like, semi-transparent tissue about the eroded part, and this may spread to the cornea, which then often has a hazy appearance in the neighborhood of the ulceration, giving, especially just before the surface of the protuberance begins to ulcerate, the picture of episcleritis. The search for corroborative symptoms of syphilis in other parts of the body will usually be rewarded by success.

Magni describes an affection, under the name of kerato-conjunctivitis gummosa, in a woman who was affected with constitutional syphilis. There appeared on the *ocular* conjunctiva several semi-globular tumors, varying from the size of a pinhead to that of a bean. These were of a whitish color at their summits and red at the base, and, except when situated near the cornea, were freely movable with the conjunctiva.

The ocular membrane, moreover, according to Desmarres,<sup>1</sup> is sometimes the seat of syphilitic tubercles coexisting with a similar eruption upon the skin. This author relates the case of a patient affected with syphilitic iritis, in whom one of the so-called condylomata of the iris, situated near its external margin, penetrated the sclerotic and formed a protuberance beneath the conjunctiva, which, moreover, was studded on every side with small, indolent, hard, and oblong tumors, exactly similar to an eruption of syphilitic tubercles upon various portions of the integument. The disease disappeared under mercurial treatment.

The mass which penetrated the sclera was probably a gummy tumor of the ciliary body, about which more will be said a little later.

Wecker, Estlander, Bull, and others have reported cases of gummy infiltration of the ocular conjunctiva. In most of these the product in the conjunctiva has appeared to be simply the extension of that in the sclera from continuity of tissue. Dr. Bull's<sup>2</sup> case is worthy of note, as possessing what would appear to be an independent focus of infiltration in the conjunctiva proper, or, at least, in the limbus. This was in the case of a man the victim of a combination of constitutional syphilitic manifestations, among which "there was a peculiar eruption upon the hands and face, composed of elevated spots with flat tops, some round, others oval, yellowish-red in color, with a narrow dark-red areola, neither painful nor tender to the touch, and presenting a mid-state between vesiculation and pustulation.

"The eyes were almost identical in appearance. Surrounding the corneæ there was a growth, most marked on the outer and lower sides, varying in height from one and a half to two lines, seated in and beneath the ocular conjunctiva. This growth extended away from the cornea on all sides about one-third of an inch, was pale yellow in color, moderately hard to the touch, with an irregular, knobby surface, and apparently destitute of vessels. The conjunctiva was firmly adherent to this growth, and the cornea was imbedded in this wall like a watch-crystal in its frame. On being incised, it cut like brawn and the hemorrhage was very slight. Upon the sclera of each eye, between the tendons of the superior rectus and external rectus muscles, and partially covering the latter, was an extensive and extremely well-marked gummy infiltration of the sclera, very vascular, very tender to the touch, and

<sup>1</sup> *Traité des Maladies des Yeux*, t. ii. p. 216.

<sup>2</sup> *American Journal of Medical Sciences*, October, 1878.

especially painful when the eyes were turned outward. This infiltration extended backward symmetrically in the two eyes, but was somewhat more extensive in the right eye. The media was clear, and an ophthalmoscopic examination revealed nothing abnormal in the deeper tunics of the eyes."

### Syphilitic Affections of the Cornea.

While ulceration of the cornea with loss of tissue is in non-specific cases the commonest form of disease to which this membrane is liable in syphilis, ulceration rarely—according to some never—occurs as the direct result of the constitutional taint. When, therefore, an inflammation of this membrane does occur, it is usually in the substance of the cornea, and in this form it is known as parenchymatous keratitis. And this interstitial affection, again, may show itself as diffuse or punctate. In these forms, moreover, it is, as a rule, the result of hereditary syphilis.

Diffuse keratitis is generally ushered in by a slight pericorneal injection, and with a slight grayish opacity near the centre of, and in the substance of, the cornea. The haziness gradually increases until the greater part of the cornea is involved, giving to this membrane the appearance of ground glass, especially when the epithelial layer is implicated. It is, as a rule, in the beginning not accompanied by much pain or photophobia, though both may be present, together with abundant lachrymation, particularly as the disease progresses to the deeper parts of the cornea. There is little vascularity as a rule, though, especially at the periphery, minute vessels may be described, which, increasing in number and extent, may give, at a little distance, a rosy hue to the cornea. I have seen cases in which there has appeared to be an interstitial hemorrhage, so deep and close was the injection. In one case, indeed, the entire cornea was a blood-red mass, as if the bleeding had occurred into the very substance of the membrane, the epithelial layer retaining its polish. Diffuse keratitis is the form which the disease usually takes in young children, while the punctate variety appears later in life, or, at least, such has been my observation. Mr. Jonathan Hutchinson<sup>1</sup> has expressed the opinion, founded upon a lengthy and ably conducted series of observations, that the peculiar inflammation of the cornea met with for the most part between the ages of three and twenty, and known by the name of "strumous corneitis,"<sup>2</sup> is always due to hereditary syphilis. In his attempt to establish this point Mr. Hutchinson has attached no little importance to certain peculiarities in the form, size, and color of the permanent incisor teeth which he regards as diagnostic of inherited syphilitic taint, and which he states are all but invariably coexistent with strumous keratitis.

It has been the custom from time to time since Mr. Hutchinson made his observations to question the validity of his views, both as to the fact of interstitial keratitis being due to hereditary syphilis and the diagnostic value of the so-called characteristic teeth. Thus, it has been asserted, not only in England, but on the Continent, and especially in

<sup>1</sup> *Ophth. Hosp. Rep.*, vol. i. p. 229.

<sup>2</sup> The name "keratitis" is much preferable to "corneitis."

Germany, that the disease may be the result of malnutrition in scrofulous and rickety subjects, and it has been maintained that the malformation of the teeth is the simple arrest of development in a perverted constitution from other causes than syphilis. Thus, Maunther<sup>1</sup> declares that "the German ophthalmologists have in no way been able to endorse the theory of Hutchinson;" while, on the other hand, Förster,<sup>2</sup> an eminent German authority, states at a still more recent date just the contrary, and maintains that "the view that interstitial and parenchymatous keratitis is frequently due to hereditary syphilis is constantly gaining more adherents."

It would be out of place in a work like the present to go deeply into a discussion in regard to matters about which there is so great a difference of opinion, but I may state briefly that I believe that the hereditary taint, though not the only, is still the predominating, cause of interstitial keratitis. And this I consider important in a clinical point of view, for I can fully confirm Mr. Hutchinson's statement that the most efficacious treatment of this disease in the majority of cases is by means of mild mercurials and iodide of potassium, assisted by a nourishing diet, fresh air, and tonics.

Keratitis punctata differs from the diffuse in that the opacity is arranged in small circumscribed spots or points. These, as a rule, do not show a tendency to coalesce. Still, this may occur, so that the masses become large enough to occupy a quadrant, or even the half, of the corneal tissue. It also differs from the diffuse in being deeper-seated and usually of a deeper grayish or yellowish color.

Maunther describes a form of keratitis punctata which is worthy of notice from the fact that it appears to be even more pathognomonic of syphilis than the ordinary keratitis punctata, and, according to my experience, rather the expression of the acquired than of the hereditary disease. This form consists in the cornea being studded with a multitude of minute dots not larger than a pin-point. These are not, as one would be inclined at first sight to infer, on the membrane of Descemet, but in the substance of the cornea itself. I have at the present moment a most beautifully marked case of this disease in a young woman of three-and-twenty, who, when I first saw her some three months ago, had a secondary eruption on the legs, arms, and neck. Externally, nothing whatever was visible which would suggest the slightest trouble with either eye, and the only complaint which the patient made was that she had noticed accidentally that she did not see as well as formerly with her left eye. There was no pain and no lachrymation, and not the slightest injection of the conjunctiva. The cornea and anterior chamber, moreover, seemed to have their normal clearness, and the iris was normal in every respect. A glance with the ophthalmoscope showed, however, the cornea to be the seat of a multitude of most minute dots, none of which were larger than a pin's point. By means of oblique illumination the most anterior of these could be seen in their real color, which was of a dingy gray or dirty white. The trouble continued, without any perceptible change and without any inflammatory symptom whatever, for nearly three months, when on catching cold there was some pain in the eye and a slight pericorneal injection,

<sup>1</sup> Zeissl's *Lehrbuch der Syphilis*, 1875, p. 288.

<sup>2</sup> *Handbuch der gesam. Augenheilkunde*, vol. vii. p. 186, 1876.



which rapidly subsided. A vigorous antisyphilitic treatment has been pursued from the first, and within the last week or two the dots have begun to disappear, these only remaining now in the central portion of the cornea.

The **treatment** of these syphilitic affections does not differ from that in the idiopathic form, and consists in the use of atropine instillations, with protection from light by means of colored glasses, antisyphilitic remedies, with a judicious administration of tonics, diet, and fresh air.

It is, moreover, sometimes necessary to perform paracentesis or even iridectomy.

### **Syphilitic Affections of the Sclera.**

These, like the non-specific, may be divided into two principal classes—those affecting the superficial tissue, or episcleritis, and those affecting the interstitial layers, or parenchymatous scleritis. To these some syphilographers add a third, or scleritis gummosa, when the sclera is the seat of this specific infiltration or product. Episcleritis begins commonly as a small hyperæmic spot, usually about a line from the margin of the cornea. As the inflammation increases in extent and degree the spot looks very much like a phlyctenula, though the coloration is more subdued, and, after a while, assumes a violet or purple tinge. On close inspection the conjunctiva is seen to be but little if at all implicated, and, as a rule, the new formation has the appearance of a bulging of the surface, which merges gradually into the surrounding tissue, rather than a circumscribed growth, though even this may occur, so that it resembles a defined tumor the size of half a pea or even larger. The favorite spot for the development of this localized inflammation is near the insertion of the external rectus muscle or between this and the superior rectus. Still, any part of the anterior portion of the sclera may be affected, or more parts than one, either successively or at the same time. In this case the spots may spread and then coalesce, until the greater part of the circumference near the cornea is affected.

When the inflammation is confined to the episcleral tissue there is, as a usual thing, but little pain, lachrymation, or photophobia, though all three may be present.

The trouble is, however, apt to propagate itself to the neighboring tissues, so that the cornea, iris, and ciliary body, one or all, may become implicated. In the last case a kerato-irido-cyclitis is produced, than which there is no condition of ocular trouble more to be dreaded, or one which will more tax, even if it does not overcome, the skill and resources of the surgeon. The implication of the cornea is usually shown by a grayish diffuse opacity, corresponding to the seat of the inflammatory spot, and extending usually in a triangular shape into the clear area of the cornea; the participation of the iris manifests itself by adhesions, and sometimes by exudation into the papillary space, and that of the ciliary body by the usual signs of cyclitis. When the episcleritis is due to a gummy deposit, it may resolve itself gradually, which is the rule under specific remedies, or it becomes eroded at its apex, forming an excavation with more or less ragged edges, while the area is occupied by a jelly-like substance of a grayish or yellowish color; and it is more than probable that some of the infiltrations which present these appearances, and which have been de-

scribed as belonging to the conjunctiva proper, have had their origin in the episcleral tissue.

Rare as the above affections are, those due to parenchymatous scleritis are rarer still. That such exist, however, I think there can be no doubt. The trouble usually begins by a circumcorneal zone of injection of a very delicate rose or pink color, which often, after the disease has continued a short time, passes into a violet or purplish tinge, which close inspection shows to be due not to vascularity of the conjunctiva, but of the sclera itself. The injection gradually extends backward until the whole anterior zone of the eye presents the delicate rosy hue mentioned above, which differs entirely from the coarser meshlike injection of an early conjunctivitis on the one hand or the deep red of iritis on the other. The trouble may continue for a long time in a low chronic type, without much photophobia, pain, or lachrymation, though the latter two may be present in an intense degree, and then the disease forcibly reminds one of the description of what the older writers called rheumatic ophthalmia. Strange to say, though it all the iris may not become implicated, dilating ad maximum under atropine, apparently even to an abnormal degree, as sometimes the merest possible trace of the membrane remains visible. This is due, I think, to the fact that the limbus becomes congested and slightly salient, thus encroaching upon and narrowing the area of the clear cornea. I have several times seen this affection in those who had recently recovered from a severe and protracted attack of gonorrhœa, and thus perhaps representing the analogue of the much-disputed gonorrhœal rheumatism. Here, as elsewhere, there is, of course, always a danger that the inflammation may extend itself to the neighboring tissue, and its early origin and destructive features may thus be concealed in the signs and symptoms of the participating parts. Resolution of these foci of inflammation usually occasions a localized resorption and thinning of the sclera, which shows itself by a bluish area, that may subsequently become the seat of a staphylocomatous projection.

Gummy infiltration into the stroma of the tissue merely differs from the episcleral in its locality.

### Syphilitic Iritis.

Of all the affections of the eye, there is none which, taken as a whole, is more serious in its immediate effects or more disastrous in its subsequent results than iritis.

It is estimated, from carefully prepared statistics, that over one-fourth of the cases of total blindness proceed from inflammation of this membrane, and when it is taken into consideration that between 60 and 70<sup>1</sup> per cent. of all cases of iritis are due to syphilitic infection, the important rôle which the specific virus plays in this class of diseases becomes at once manifest, and strongly emphasizes the fact that, since the integrity of one of the most important organs of the human frame is involved, syphilitic iritis should be familiar to every student of venereal, in order that he may early be able to recognize and treat it.

<sup>1</sup> My friend, Dr. Henry D. Noyes, of the Infirmary, informs me that, according to statistics collected and reported in his lectures by Prof. Graefe, about 60 per cent. of all cases of iritis occur in persons affected with syphilis. See also Wecker, *Etudes ophthal.*, tome i. p. 394.

Let me premise by saying that we have no certain means of distinguishing syphilitic iritis from that dependent upon injury, rheumatism, or other causes, although there are certain symptoms, presently to be described, which, when observed, render the former origin probable. Moreover, the majority of cases of iritis are doubtless due to syphilitic taint, so that the existence of this disease should always excite suspicion, and lead the surgeon to make a thorough examination of the present condition and past history of the patient.

In accordance with the teachings of pathological anatomy, modern ophthalmologists have divided inflammation of the iris in general into three classes :

- (1) Simple or plastic iritis ;
- (2) Serous iritis ;
- (3) Parenchymatous or suppurative iritis.

It is to this last division that the so-called syphilitic iritis, as a rule, belongs ; still, as the disease may, and often does, assume either of the above forms, a short description of each will be given, omitting the more minute details, which are chiefly of interest to the ophthalmologist, and which are apt to confuse the mind of one who has not made a special study of the eye.

*Simple or Plastic Iritis.*—This form is characterized by congestion of the membrane, but differs from simple hyperæmia of the iris by the production of an exudation either from the pupillary border, surface, or stroma of the iris, and in some cases by an increase in the elements of the connective tissue.

This variety of the disease may assume a very mild character, presenting but a very moderate degree of subconjunctival injection, and accompanied with but little discoloration of the iris, pain, or dread of light. Indeed, it may happen that the entire trouble escapes detection till the use of atropine brings to light the existence of one or more adhesions of the iris to the anterior capsule of the lens, producing under dilatation the characteristic irregularity of the pupil.

More frequently, however, there is injection of the conjunctival and sclerotic vessels, giving the eye a red appearance. But unnatural redness is observed in simple conjunctivitis, and how shall the two be distinguished ? In the first place, by depressing the lower lid, and at the same time telling the patient to look upward, whereby the inferior palpebral fold will be exposed. In most cases of conjunctivitis the greatest amount of injection will be found remote from the cornea, while in iritis the contrary is the case ; the redness is almost entirely confined to a circle around the cornea called the “sclerotic zone,” and the more distant portions of the white of the eye remain clear. If the eye has been congested by the injudicious application of poultices, alum, curds, etc., this difference will be less or not at all apparent. Again, observe the character of the injection : some of the conjunctival vessels are distended, and may be recognized by their brick-red color, large size, tortuous course (chiefly over the recti muscles), and their mobility if the conjunctiva, by means of slight pressure with the finger external to the lid, be made to slide over the sclerotica ; but beneath these brick-red vessels a second layer is discovered on close examination, composed of others radiating from the margin of the cornea, much finer than the



preceding, straight and of a pinkish hue, and which are seen to remain stationary through the meshes of the sliding network of conjunctival vessels. It is these vessels which constitute the sclerotic zone, met with not only in iritis, but in other internal inflammations of the eye.

Next observe the condition of the iris and pupil and compare them with those of the opposite and sound eye. The affected iris is seen to have lost its natural brilliancy; its minute texture is less apparent; its surface covered over with a thin layer of fibrin; and its color changed. In persons with blue eyes it assumes a yellowish-green hue; in others the change is less marked, but may generally be detected. Close the two eyes with the thumb of each hand, the fingers resting for support upon the temples, and alternately open one and then the other, and the iris of the affected eye will be found to be sluggish in its motions or quite immovable.

At an early stage of the disease the pupil assumes a dull appearance, and is less clear and bright than in the normal condition, owing sometimes to a slight turbidity in the aqueous, and sometimes to a delicate film of exudation from the margin of the iris over the anterior capsule. I have, moreover, sometimes thought that the capsule itself or the underlying epithelial-cell layer becomes implicated, though of this, so far, I have had no anatomical proof. The pupil may also become irregular in shape. This irregularity of outline, due to adhesions between its margin and the capsule of the lens or to exudation into its substance, becomes more marked as the disease progresses, and is especially evident if the pupil be dilated by belladonna or atropine, when its margin is found to be scalloped, owing to its being attached at some points and drawn out in others. In some cases the adhesions become continuous around the whole circumference, and the capsule of the lens is covered with a layer of lymph which completely blocks up the pupil.

*Serous Iritis.*—This is distinguished from the simple variety by the fact that the exudation is of a serous instead of a plastic nature, and is due to a hypersecretion of slightly turbid aqueous humor, which produces, as a rule, an increase in the intraocular tension.

On this account the anterior chamber becomes deepened, and the pupil, instead of being contracted, moderately dilated, sometimes markedly so. This is probably due to direct pressure by the contents of the globe upon the nerves of the iris.

The circumcorneal injection is here much less than in the plastic form, or it may be entirely wanting. Besides the aqueous humor becoming slightly cloudy, the entire posterior surface of the cornea appears oftentimes as if covered with a delicate film, and minute punctated opacities make their appearance upon the internal lining membrane (membrane of Descemet). These spots owe their existence, at least in the beginning of the disease, to the precipitation upon the membrane of minute particles, which are held in suspension in the troubled aqueous humor, and which often disappear when the anterior chamber is evacuated by paracentesis corneæ. Later in the disease, however, they assume a somewhat larger size, and are then permanent, being due to a morbid change in the epithelium of the membrane itself.

Sometimes these punctated spots are either entirely absent or are so slight as to escape any but a most careful examination. In this

case the predominant symptoms—viz. slight discoloration and dilatation of the iris, and trifling cloudiness of the aqueous humor—are very easily overlooked by an inattentive observer, and the disease is allowed to progress until it extends itself to the ciliary body and choroid, gradually involving the deeper structures, and the eye falls, step by step, into a state of low chronic glaucoma.

In this form of iritis it seldom happens that there are any adhesions of the iris to the capsule of the lens.

I have been particular in giving the principal symptoms of this peculiar form of iritis, both on account of its insidious nature, which renders it so liable to escape detection, and from the fact that it has been alleged to be oftentimes the product of hereditary syphilis.

*Parenchymatous or Suppurative Iritis.*—This form of iritis is characterized by a deep-seated inflammation affecting the stroma of the iris, and giving rise to a considerable swelling of the membrane, and causing an increase in its cellular tissue-elements. Owing to this fact, the surface of the iris becomes elevated in different parts, and vessels, sometimes of considerable size from arrest in their circulation, make their appearance on the surface of the membrane. These elevations are almost entirely composed of cellular tissue, and usually contain a number of vessels of new formation.

It is in this form of iritis that we meet most frequently with extensive adhesions between the margin of the pupil and the lens, together with a complete loss of contractility of the iris, and when these adhesions once take place they are far more obstinate in resisting the effect of atropine than those of simple idiopathic iritis. Here, too, the production of pus in the anterior chamber is much more rapid and abundant.

The so-called syphilitic iritis of various authors is, strictly speaking, only a variety of parenchymatous iritis, its distinguishing characteristic being that the inflammatory action is more circumscribed, confining itself usually to one part of the iris, while the neighboring portions preserve, for a considerable time at least, a nearly perfectly normal condition. In the same way it is less apt to propagate itself in the deeper-lying membranes. It is here that we find those peculiar brownish or yellowish elevations upon the surface of the iris which generally, though not always, occur on its inner ring near the margin of the pupil.

These “tubercles”—or “condylomata,” as they are called—gradually increase in size, and sometimes become organized and covered with a network of small vessels. They vary exceedingly in their dimensions, sometimes acquiring a growth sufficient to occupy the quarter or even one-half or more of the entire iris, and, if then situated near the external border of the membrane, may cause projection of the cornea or sclerotic.

It has been demonstrated by Colberg<sup>1</sup> that the composition of “tubercles” is identical with that of gummy tumors as described by Virchow.<sup>2</sup>

The presence of these tubercles affords a very strong probability, if not an absolute certainty, of syphilitic taint. Of sixty cases of iritic tubercle collected by Graefe, in only two was there no proof of syphilitic infection.

<sup>1</sup> *Archiv für Ophth.*, t. viii. p. 288.

<sup>2</sup> *Archiv für Path. Anat.*, No. 15, p. 265.

Such evidence as this, from such a source, must be considered almost conclusive that there is a specific form of iritis differing from that of the idiopathic form, although such has been denied. So far as my own personal experience goes, I have never seen a case of "condyloma" of the iris which could not be traced to a syphilitic source. I have, however, seen one case in a non-syphilitic subject which might have been, and indeed was, taken for a "tubercle." The trouble began and continued in its course precisely like a "tubercle," with all the signs and symptoms of iritis, until it had reached a certain stage, when it ruptured, sending out into the anterior chamber a feathery, purulent exudation like the tail of a comet. After a careful consideration and observation of the case, I could attribute the appearance only to a papule in the tissues of the iris. Dr. Kipp has also reported a similar case in a syphilitic person.

When syphilitic iritis is early and successfully treated, the iris resumes its normal mobility and color and the eye is restored to its original integrity. But in weak and cachectic subjects, and in the absence of appropriate treatment, the changes which take place are more or less permanent. The tubercles are absorbed, but the iris never regains its original color and consistency; it is thinned and friable, and its adhesions to the capsule, unless stretched or broken by the persevering use of mydriatics, permanently impede the motions of the pupil. As a general rule, the pain and photophobia in syphilitic iritis are much less than in the other forms of the disease. The patient may merely complain of a sense of fulness and uneasiness in the globe, and shrink from exposure to a strong light only. In other cases severe pain is felt in the ball of the eye and in the temporal and supraorbital regions, when the least ray of light causes the most intense suffering; the variations between these two extremes are numerous. There is almost invariably some dimness of vision, which is due not only to the changes in the capsule of the lens, but also to those in the deeper structures of the eye, which are always involved to a greater or less extent.

Iritis, as a rule, presents such marked symptoms that it is usually recognized by any competent person, and yet every ophthalmic surgeon must have met with not unfrequent instances in which through carelessness or ignorance it has been mistaken for simple conjunctivitis, and treated solely with collyria of nitrate of silver, sulphate of zinc, etc. A few cases, however, are met with in which the most experienced surgeon may for a day or two fail to make a diagnosis. This generally occurs at the commencement of the disease, before any marked changes have taken place in the iris, and especially when the conjunctival vessels have been congested by the application of poultices. Impairment of vision will afford valuable aid to the diagnosis, and the instillation of a drop of a solution of atropine will soon decide the question by showing irregularity of the pupil if the case be one of iritis.

It is well in these doubtful cases to use a very weak solution, as then the inconvenience of a lengthy mydriasis is avoided in case the trouble should prove to be conjunctivitis and not iritis. One of Moore and Savory's atropine wafers, divided into two or even four pieces, each piece then equalling only  $\frac{1}{80000}$  of a grain, is sufficient. If the iris is not the seat of the trouble, it will dilate in less than an hour, and the next day the dilatation will have passed off. In place of a wafer, a solution may



be used which can be readily made by putting one drop of the ordinary solution (gr. ij to 3j) into half an ounce of water. One drop of this equals  $\frac{1}{50000}$  of a grain.

I have already remarked that the diagnosis of syphilitic iritis, although rendered highly probable by the absence of severe pain and photophobia and the presence of tubercles upon the iris, can only be satisfactorily established by the history of the case or the coexistence of undoubted syphilitic symptoms. I would also add that the presence of any general eruption upon the body leaves scarcely room to doubt that a coexisting iritis is of specific origin, since this disease, when due to other causes, is very rarely accompanied by affections of the skin. The practical surgeon, when called to treat a case of iritis, almost instinctively turns to the arms, chest, and abdomen to look for traces of one of the syphilides, to the throat for mucous patches, and to the neck for engorged ganglia. As noticed by Carmichael, the accompanying eruption is in most cases papular.

In regard to the particular period of the general trouble in which specific iritis makes its appearance no precise rule can be laid down; still, the form which is most common and most worthy of our attention is to be ranked among the secondary symptoms of syphilis. Without being able to furnish any statistics from which the exact time of its development may be determined, yet I have often been struck with the fact that when no mercury had been administered this occurred from four to six months after contagion. In a number of instances iritis has been the first general symptom which has induced patients to seek surgical advice, but careful inquiry has never failed to show that other symptoms, as alopecia, engorgement of the cervical ganglia, mucous patches, erythema, or papules, had preceded it, although regarded at the time as of no importance.

Wecker observes<sup>1</sup> that the specific form of iritis occurs more frequently when the disease has been a long time in developing itself than when it has pursued a rapid course.

There is, however, another form of iritis which is met with chiefly as a symptom of tertiary syphilis, and differs from the preceding mostly by the insidious manner in which it attacks the eye and by its greater persistency. There is almost a complete absence of pain and photophobia; the iris becomes infiltrated and covered with exudation, having a peculiar swollen and velvety appearance; numerous adhesions take place between its pupillary margin and the capsule of the lens; and the irregular pupil is blocked up with an effusion of lymph, upon which small, black, uveal deposits may often be detected. The eyes are generally attacked in succession; the disease is exceedingly persistent, and with difficulty controlled by treatment, the danger of complete loss of sight from obstruction of the pupil being very great. The deeper structures of the eye appear to be implicated to a less extent than in the acute form.

Among the absurdities of medical belief that have had their day is to be reckoned the idea that mercury may give rise to iritis—a disease which is often met with when no specific remedy has been employed, and which can in no way be better controlled than by the judicious use of mercurials; indeed, the surgeon rarely has an opportunity of witnessing a more remark-

<sup>1</sup> *Études ophth.*, t. i. p. 396.

able effect of treatment than is seen in the absorption of lymph, the disappearance of the abnormal injection, and the restoration of the iris to its original condition, which takes place under the administration of mercury in acute syphilitic iritis. It is hardly necessary to say that an agent of so much good is capable of doing a great amount of harm, and that I am here speaking of its use and not of its abuse.

The plan of **treatment** of the acute form of iritis which I have found almost uniformly successful has for its objects—

1. To bring the system under the influence of mercurials as speedily as possible without injury to the general health and without inducing salivation.

2. In a depressed state of the system to combine tonics with mercurials, or to employ the former in connection with iodide of potassium instead of the latter.

3. To keep the pupil constantly dilated by means of atropine, and thus prevent adhesions between the iris and capsule of the lens.

4. To relieve pain and regulate the general hygienic management of the case.

The subjects of these different heads will be somewhat briefly considered, in view of the fact that most of them have been included in what has been said of the general treatment of syphilis.

It is of the first importance in the treatment of iritis to maintain the pupil in a constant state of dilatation, so as to remove the iris as far as possible from the convex surface of the lens and prevent adhesions or closure of the pupil with lymph. For this purpose instillations of a solution of atropine are far preferable to extract of belladonna smeared upon the brow. In addition to its power of dilating the pupil, atropine is a most valuable sedative—a rare combination in the same remedy. Two grains of the neutral sulphate to the ounce of distilled water is the formula which I commonly employ. This solution is best applied to the inner canthus by means of an eye-pipette or a camel's-hair brush; in default of which the patient's head may be thrown back, and a small portion of the fluid be poured upon the concavity upon the side of the nose, when some of it may readily be made to flow between the lids. If the case be seen at the outset, before the motions of the iris are impeded by an infiltration of lymph, two or three times a day will be sufficiently often to use the drops.

In the acute stage of iritis some authors advise us entirely to abstain from the use of atropine and belladonna, which have but little power of influencing the pupil after effusion has taken place, and which, it is said, may "irritate and tease the iris and cause pain."<sup>1</sup> My own experience leads me to believe that these fears are groundless. Instead of aggravating, I believe that atropine greatly relieves, the pain and irritation, and although its immediate action upon the pupil is not perceptible, yet it gradually stretches or breaks down the adhesions already formed, and thus assists the iris in recovering its dilatability; hence I am in the habit of increasing the frequency of the instillations, during the acute stage, to three or four times a day, and in case the iris is still obstinate in yielding it is advisable to increase the strength of the solution to four or five grains to the ounce of water, and to instil a drop into the eye every five minutes

<sup>1</sup> Critchett, "Lectures on Diseases of the Eye," *London Lancet*, Am. ed., March, 1855, p. 216.

for twenty minutes or half an hour at a time, repeating this method of application three or four times a day. Care should be taken, however, that the atropine, some of which gains the pharynx through the lachrymal and nasal passages, does not produce its physiological effects upon the general system.

Very recently a new mydriatic, duboisine, has come into use. It has the same effect as atropine, though it is somewhat more powerful. It is claimed that it is less apt to produce the poisoning of the circumorbital skin, and that it may be used when this has been occasioned by atropine. My own experience with it, however, does not support this claim, for in several instances, when the poisoning had been once produced, it was maintained by duboisine just as it is by atropine. It is well, however, in those cases which promise to be protracted to use the drugs alternately.

Should the iris refuse to yield even after this vigorous use of atropine, the action of the drug can often be induced by decreasing the tension of the eye through the application of leeches to the temple or by the evacuation of the anterior chamber by paracentesis corneæ.

Venesection is never required in syphilitic iritis, though local depletion by means of cups and leeches is often advisable in those cases in robust subjects where the pain is very severe; and when this assumes a neuralgic character frequent fomentation of the eye and surrounding parts with water as hot as can be borne often gives great relief. Here, too, a subcutaneous injection of morphia in the region of the temple often stops at once a paroxysm of pain, which then does not show itself again, or at least not in its former violence. After the acute stage has passed counter-irritation may be effected by painting the brow with the strong tincture of iodine. This remedy is, however, not as much employed as formerly.

It is highly important that the patient should obtain sleep, for which purpose ten grains of Dover's powder may be given at bed-time, and repeated if necessary. In many cases, however, frictions upon the brow and temple at bed-time of mercurial ointment, with the addition of powdered opium (ung. hydrarg. ʒj, pulv. opii ʒj) will suffice to allay pain and procure sleep.

In this as in nearly all affections of the eye the surgeon has to contend with the deeply-rooted prejudices of the masses in favor of poultices of bread and milk, tea-leaves, alum curds, raw oysters, pieces of pork, *et id genus omne*. Not only should all such vile applications be put far away, but the eye should not be tied up with handkerchiefs or cloths in any manner. In women the best protection against the strong light is a veil; in men a pasteboard shade will answer the same purpose.

In unfavorable weather or in unusually severe cases of iritis the patient should be confined to the house, or even to his room, which should be shaded, but not darkened. In most cases, however, when the weather is fair, it is desirable that the patient should pass a portion of the day out of doors, in the early morning or evening if the intolerance of light be excessive, and with the eye protected in the manner above directed, or, better still, by a pair of tinted glasses of the kind which is known to the opticians as "coquilles," the color of which should be some shade of blue or London smoke, never green. Photophobia and irritability of the eye will be aggravated by confinement to a dark room.

The diet must be proportioned to the general condition of the system.



Robust subjects should take but a small quantity of light food, while the cachectic require an abundant supply of nourishment and, it may be, stimulants. Proper attention should also be paid to the digestive organs, and a daily evacuation of the bowels secured.

The chronic form of iritis, met with in tertiary syphilis most frequently, occurs in persons whose constitution is enfeebled and by whom mercury is poorly tolerated; but when properly guided by tonics this mineral may still, in many cases, be used with marked benefit; in others we are obliged to resort to iodide of potassium until by every available means the general health is restored. Mercurial inunction or fumigation may often be employed when mercury by the mouth cannot be borne. In these cases one-half or even a drachm of the oleate may be rubbed into the soles of the feet alternately or under the armpits each night.

Such being the therapeutical remedies which experience thus far has shown us to be the most beneficial in the treatment of syphilitic iritis, two others, belonging properly to the domain of surgery, ought to be briefly considered, or at least mentioned, here. I allude to paracentesis corneæ and iridectomy.

If, in spite of all our efforts at medication, the aqueous humor becomes very cloudy, or the pain increases, or the tension of the eyeball becomes augmented, with a corresponding decrease of the amount of vision and contraction of the visual field, or if a considerable collection of pus takes place into the anterior chamber, then a paracentesis should be performed, and repeated several times, if necessary; and especially should this be done in the last-mentioned condition, for, of all the remedies which we possess against the formation and increase of hypopyon, none is more efficacious than this.

Should, however, the disease still steadily progress and the above symptoms increase in severity, and give evidence that the inflammatory action runs in danger of seriously involving the deeper structures of the eye, then an iridectomy should be performed at once, for it often happens that an inflammation which has resisted all other agents quickly subsides after this operation. The above is applicable to all forms of iritis.

For a more detailed description of these two operations, as well as of those intended for the relief of closure of the pupil from the effects of iritis, I must refer the reader to works upon ophthalmic surgery, merely remarking that these operations require considerable delicacy of manipulation, and if the general practitioner feels that he does not, from want of practice, possess the requisite technical skill, then it is his duty to obtain the services of some one who has made these matters a special study.

*Infantile Iritis.*—An extremely interesting form of iritis is met with in infants affected with hereditary syphilis. It is a rare disease, but probably exists in many instances in which it is overlooked.

Mr. Hutchinson deduces the following conclusions from a series of twenty-one cases:<sup>1</sup>

1. That the subjects of infantile iritis are much more frequently of the female than the male sex.

2. That syphilitic infants are most liable to suffer from iritis at about the age of five months.

<sup>1</sup> *Med. Times and Gaz.*, July 14, 1860; also *Ophthalmic Hospital Reports*, vol. viii. p. 217, 1875.

3. That syphilitic iritis in infants is often symmetrical, but quite as frequently not so.

4. That iritis, as it occurs in infants, is seldom complicated, and is attended by but few of the more severe symptoms which characterize the disease in the adult. Haziness of the cornea and photophobia, which are common in adults, are rare in infants, in whom there is also but little pain and sclerotic injection.

5. Notwithstanding the ill-characterized phenomena of acute inflammation, the effusion of lymph is usually very free and the danger of occlusion of the pupil great.

6. Mercurial treatment is most signally efficacious in curing the disease, and, if recent, in procuring the complete absorption of the effused lymph.

7. Mercurial treatment previously adopted does not prevent the occurrence of this form of iritis.

8. The subjects of infantile iritis, though often puny and cachectic, are also often apparently in good health.

9. Infants suffering from iritis almost always show one or another of the well-recognized symptoms of hereditary taint.

10. Most of those who suffer from syphilitic iritis are infants born within a short period of the date of the primary disease in their parents. This accords with what is observed in the iritis of adults, which in a great majority of instances is a secondary and not a tertiary symptom.

I have seen only one instance of this affection in an infant at the infirmary, who was not brought a second time, and whose case I was therefore unable to follow out. I once had under my charge a case of double chronic iritis in a boy aged ten, affected also with engorgement of the cervical ganglia, who, as reported by his father, was said, by the attending physician (Dr. G. L. Bedford), to have contracted syphilis from his wet-nurse. I may mention incidentally that his teeth were generally misshapen, and that one of his upper incisors was completely perforated by a small hole about one-third of its length from the lower margin.

*Spongy Iritis.*—Under this title some ophthalmologists have of late years described a form of iritis which consists of a gelatinous, spongy exudation into the anterior chamber from the surface of the iris. This has been claimed to be due to syphilis. It has, however, no pathognomonic significance, and may occur in the idiopathic form or from simple traumatism.<sup>1</sup> The manner in which it is formed and the appearance which it presents have already been described at length in speaking of Episcleritis.

### Affections of the Lens.

So far, the lens has never been observed to be primarily the seat of any syphilitic inflammation or product. Secondary changes in the capsule and lenticular substance, in which the lens become either partially or wholly cataractous, are common enough. The only relief from these is surgical, and may consist either in the formation of a new pupil or extraction, and I am inclined to believe, from my own experience, that these cases of cataract with numerous adhesions, even to the extent of total synechia, do not offer so bad a prognosis as is commonly supposed.

<sup>1</sup> Dr. Gruening, *Archiv. Ophth. and Otol.*, vol. iii. p. 1, 1873.

### Affections of the Ciliary Body.

Inflammations of the ciliary body (or cyclitis) which are not due to extension of the morbid process from the iris on the one hand, and the choroid on the other, are extremely rare. Syphilitic cyclitis, like the non-specific, shows itself by a deep-lying, partial or total pericorneal injection of a livid color, which is usually more intense in one particular spot, and, as a rule, at the upper portion, though it may be in any part of the scleral zone. Sometimes more than one of these foci exist at the same time. There is usually a peculiar retraction of the iris opposite the inflammatory centre or centres, which is then useful as a diagnostic mark of the trouble being limited to the ciliary body, for if the iris is implicated the contraction of the pupil conceals this peculiarity in the shape of the iris. Here, as elsewhere in the uveal tract, the only distinctive mark of the syphilitic taint is the characteristic gummata.

The **diagnosis** of these troubles is oftentimes somewhat speculative, as, from the position of the ciliary body, these affections do not lie open to either direct inspection or that of the ophthalmoscope. Virchow<sup>1</sup> was, however, fortunate enough to see a gummy tumor of the ciliary body which, ophthalmoscopically and by oblique light, was seen and taken by others for a sarcoma. That syphilis was the cause of the tumor was demonstrated by the fact that it disappeared under specific treatment.

### Choroiditis.

Choroidal affections, like those of the iris, have been divided into three principal classes: *Plastic* (exudativa, disseminata) *choroiditis*; *Serous choroiditis*; *Parenchymatous* (suppurative) *choroiditis*.

It must be admitted that the distinctions between these various forms cannot be drawn, either pathologically or clinically, so closely as those of iritis; still, as they are based on anatomical research, however meagre, they are preferable to any classification of a merely arbitrary character, and will therefore be retained here. Inasmuch as they may all be the product of syphilitic infection, a short description of each will be given.

*Plastic Choroiditis*—or, more properly speaking, choroiditis exudativa—is characterized by the production of an exudation upon the surface or in the substance of the choroid. This exudation manifests itself, when seen by the ophthalmoscope, by the presence at the bottom of the eye of certain circumscribed spots or patches, varying greatly as to number, shape, and size. When freshly deposited they are of a yellowish-white or pale-straw color, and give the appearance of having been flecked on to the membrane, the pigment epithelium preserving, as a general rule, a perfectly normal aspect. These spots entirely conceal from view the subjacent choroid, so that the epithelial layer, together with the deeper-lying vascular tonics, are completely hidden from sight; while, on the contrary, the retinal vessels, which, as a rule, run over the patches unimpeded in their course, are brought strongly in view through contrast, and clearly prove the trouble to be in the deeper-seated membrane.

These spots of exudation may be entirely absorbed, and leave but

<sup>1</sup> *Jahresbericht der Ophth.*, 1872, p. 307.



little or no trace of their former existence; but usually they pass to a secondary or atrophic stage, in which, although the exudation itself disappears, the underlying and surrounding tissue becomes implicated. On this account the substance of the choroid itself undergoes atrophic changes, permitting the sclera, on account of the former becoming thinned, to show through, thus giving to what were formerly straw-colored spots a glistening white appearance. These atrophic spots may be further distinguished from those due to simple exudation by the fact that single choroidal vessels or their remains may be detected on their surface, while their border, instead of being sharply defined and surrounded by normal-looking tissue, is irregular, and marked by collections of dark pigment-cells, which, from proliferation, may combine together so as to form a black zone, which then surrounds in part or in whole the denuded spots, or the pigment may lie irregularly scattered over its surface. This latter takes place, especially in the early stage of the disease, when the trouble is confined to the internal and pigmentary layers, producing a condition known as "maceration of the pigment of the choroid," in which the coloring matter is distributed irregularly, thinned in some places and aggregated in others, thus giving to the fundus of the eye a mottled or watery appearance, as if sprinkled with ink.

*Serous Choroiditis.*—This is characterized by the exudation from the choroidal membrane being of a serous instead of a plastic nature, and presents externally oftentimes the same appearance, both as to the dilatation of the pupil and spots upon the inner surface of the cornea, as serous iritis.

The ophthalmoscopic appearances are not well marked, and are sometimes entirely wanting. When present, however, they are such as are produced by increased intraocular pressure, and are chiefly confined to the pigment epithelium, the whole surface of which may be affected, exhibiting the changes peculiar to the condition of "maceration." Sometimes this form is also accompanied by extensive changes in the fundus, similar to those just detailed under the plastic form. This variety is exceedingly prone to fall into a glaucomatous condition, and is then accompanied by excavation of the optic nerve and the other ophthalmoscopic signs common to that disease.

*Parenchymatous Choroiditis.*—This is a deep-seated inflammation, with a marked tendency toward an increase in the cellular tissue-elements, especially in the neighborhood of the larger choroidal vessels. This hypertrophy of the cellular tissue, as in this form of iritis, sometimes forms masses which are elevated considerably above the surrounding level of the choroid, and may attain the size and appearance of a veritable tumor, most probably of gummy origin, and as such project into the vitreous humor, its surface being covered by the retina, which ordinarily undergoes fatty degeneration.

It is this variety of the affection which has been described by various authors as "choroiditis circumscripta," and attributed by them particularly to a syphilitic origin.

The fact is, however, that the predominant cause of all choroidal affections is the specific virus, and the particular form under which it shows itself most frequently is certainly the plastic form (choroiditis exudativa). There are, however, even in this latter form certain pecu-

liarities, which have been thought by some of the leading authorities (Graefe, Liebreich, Schweigger, and others) to be characteristic of the specific origin of the disease. The chief of these are—

(1) The spots of exudation and atrophy are, as a rule, situated at the posterior pole of the eye and in the neighborhood of the macula, instead of, as in the idiopathic variety, at the periphery. They also have a tendency to arrange themselves in groups, and are less apt to coalesce with each other, while at the same time they penetrate deeper.

(2) The retina and optic nerve are more apt to be involved, and sometimes to such a degree as to undergo subsequently partial or complete atrophy.

(3) The choroidal affection is very liable to be complicated with a characteristic disturbance of the vitreous, which often appears and disappears with great rapidity. Oftentimes this opacity is so delicate as to give the idea of a slight want of transparency of the retina.

I must, however, guard the reader against placing too much dependence on the above statements as to the specific origin of the disease, especially in regard to the situation and general contour of the patches, as these are often situated, even in undoubted cases of specific infection, at the very periphery, instead of the posterior pole, of the eye, and may assume, whatever their seat, any and all shapes. So, too, disturbance of the vitreous humor is one of the commonest complications of all choroidal affections.

It would be out of place in a work of this kind to give a detailed description of all the ophthalmoscopic appearances which this protean disease may assume. I would, therefore, since the use of the ophthalmoscope has now become so prevalent and opportunities for its study so attainable, strongly advise the student of venereal diseases to make himself acquainted at least with the general outlines of ophthalmoscopy.

It is only in this way that he can get at all an adequate idea of a large class of diseases which are intimately connected with syphilis, and in this connection I would refer the reader to the magnificent plates of Jaeger,<sup>1</sup> Liebreich,<sup>2</sup> and Stellwag von Carion.<sup>3</sup>

If the connection between the iris and choroid, anatomically speaking, is an intimate one, clinically speaking it is even more so, and the diseases of the one may be considered as the analogue of the other: for this reason the indications for treatment and the remedies to be employed are, as a rule, precisely the same as those laid down under Iritis, only greater care and attention are, if possible, required of the physician, as the part concerned is hidden from ordinary inspection.

Choroiditis syphilitica, as a rule, belongs to the later stages of life, in which the disposition to all choroidal troubles is particularly marked. Out of fifty-five cases, forty were above thirty years, and of these forty, fourteen were over fifty years of age. The appearance of the disease

<sup>1</sup> Jaeger, *Ophthalmoskopischer Handatlas*, 1868, "Choroiditis Exudativa," Tafel xxii., Figs. 99, 100; Taf. xxiii., Figs. 101, 102, 104; Taf. xxiv., xxviii., xxix.

<sup>2</sup> Liebreich, *Atlas d'Ophthalmoscopie*, "Choroiditis Syphilitica," Table iv., Fig. 2. (See also Soelberg Wells, for copy of the same.)

<sup>3</sup> Stellwag von Carion, *Am. ed.*

usually coincides with the late secondary and the early tertiary symptoms.<sup>1</sup>

Sufficient has been said under Iritis of the necessity for, and the efficacy of, the operations of iridectomy and paracentesis, and of those for the removal of the eye when the other is threatened by what is known as sympathetic ophthalmia (a contingency which should never be lost sight of), but I must refer the reader to the various text-books on ophthalmic surgery for their minute description.

The **complications** which are to be feared in choroiditis are extension of the inflammatory action to the neighboring tissues, to the iris (producing irido-choroiditis), to the retina and optic nerve. There is danger also of exudation from the choroidal vessels producing subretinal effusion, with subsequent separation of a part or the whole of the membrane.

### Retinitis.

The natural effect of inflammation upon the transparent retina is to give it increased vascularity and cause effusion into its substance and render it opaque. Hence one of the earliest signs of retinitis is increased redness of the optic-nerve entrance, imparting to it a pinkish hue, or the trouble may show itself simply by a slight œdema, which obscures the contour of the nerve, or the vessels which emerge from the optic disk to be distributed to the retina may be abnormally enlarged, injected, and tortuous, and at certain points of their course lost to view, owing to the opacity of the retinal tissue which covers them. Their rupture may also give rise to small patches of ecchymosis. Again, effusion into the substance of the retina first impairs its transparency, and produces the appearance of a fog or haze in the fundus of the eye, and finally entirely conceals the entrance of the optic nerve, the site of which can only be determined by the convergence of the dilated veins. The obscurity of the deeper structures may also be increased by transudation into the vitreous humor. Deposits of lymph in the retina may also give rise to light-colored patches similar to those produced in the choroid; but the former may be recognized from the fact that they conceal the choroidal and retinal vessels, which in the latter may be seen to cross the patch.

Although the ophthalmoscopic appearances of specific retinitis do not differ, as a whole, from the non-specific form, still there are certain peculiarities attending it which are supposed to be characteristic of its syphilitic origin.

Thus, it has been observed that the inflammatory changes do not, as a rule, either in the vascular system or in the substance of the retina, reach the same intensity as in the idiopathic form. Sometimes, indeed, these are so slight as only to give the idea of a normal retina seen through a delicate gauze, which, however, has been proved by the microscope to be due, not to any disturbance in the vitreous, but to changes in the retina itself. The alteration in the tissue does not, as a rule, extend equally in all directions from the optic nerve, but is usually more developed on one side than the other, and the border of the disturbance is more sharply defined than in the simple form, while the

<sup>1</sup> Förster, *Handbuch der gesammten Augenheilkunde*, 1876, vol. vii., Part 1st, p. 191.



exudations into the substance of the retina have a tendency to extend along the vessels.<sup>1</sup> Schweigger,<sup>2</sup> Von Graefe,<sup>3</sup> Classen,<sup>4</sup> and others have also described some peculiar forms of syphilitic retinitis, which, with their fine-drawn distinctions, are, however, of interest rather to the ophthalmologist than to the general physician, and I would therefore refer the reader who is curious about these matters to the articles themselves.

Retinitis is by no means as frequent a symptom of secondary syphilis as iritis; it is, in fact, rather a rare occurrence, and when it does take place it is usually with the later series of symptoms; thus, in one instance which came under my observation the patient suffered from this disease fifteen months after an attack of iritis, and at a time when no other syphilitic symptoms were present.

It is certainly an interesting fact in this connection that Mooren<sup>5</sup> says that he has never seen specific retinitis accompanied at the same time by any other syphilitic symptoms. The same author mentions that he has often observed that the subjective phenomena of light are more marked in syphilitic than in the simple form of retinitis, and that these are often accompanied by zone-like limitations in the field of vision, and hemeralopia. These latter may also occur in that form of specific choroiditis which is attended with infiltration of pigment into the retina. When both the choroid and retina are affected we have a combination of the symptoms of both under the name of choroido-retinitis.

Moreover, it must be borne in mind that the subjective symptoms of both retinitis and choroiditis are often so slightly marked at their commencement as to attract but little attention from the patient, and irreparable mischief may be done before their gravity is fully appreciated. I have repeatedly met with cases of syphilis in which some slight complaint from the patient has led to an ophthalmoscopic examination of the eye, disclosing the existence of a disease which threatened the loss of sight, but which was subsequently arrested by appropriate treatment. Consequently, any impairment of vision in syphilitic subjects, although unattended by symptoms of external inflammation, should at once put the surgeon upon his guard and lead him to resort to specific remedies. Indeed, the latter are usually the only resource, as operative interference is very rarely, if ever, called for.

The **prognosis** is generally favorable when appropriate treatment is employed at an early stage of the disease, and in this respect syphilitic choroiditis and retinitis resemble syphilitic iritis.

### Affections of the Optic Nerve.

Inflammation of the optic nerve, or neuritis, which is not an extension of the process from the retina or choroid, is an extremely rare result of the syphilitic infection—so rare, indeed, that it has been doubted by competent authorities whether the optic nerve was ever primarily affected.

<sup>1</sup> For more minute distinctions see *Lehrbuch der Ophthalmoscopie*, Manthner, Abth. ii. p. 368. For ophthalmoscopic plates of syphilitic retinitis see Liebreich's *Atlas*, Tab. x., Figs. 1 and 2.

<sup>2</sup> *Augenspiegel*, p. 110.

<sup>4</sup> *Archiv*, x. 2, p. 157.

<sup>3</sup> *Archiv für Ophth.*, vii. 2, p. 211.

<sup>5</sup> *Ophthalmologische Beobachtungen*, p. 287.

Thus, Hughlings Jackson says: "Optic neuritis from syphilis is not syphilitic optic neuritis. The optic neuritis produced by a syphilitic tumor is just like that produced by a glioma or by any other adventitious product in the cerebrum or cerebellum."<sup>1</sup>

Förster, on the other hand, is of the opinion that choked disk, dependent on syphilis, may occur, not as a symptom of an intracranial trouble, but as the result of gummy infiltration of tissue between the sheaths of the nerve, rather than of the nerve-stem itself. He also calls attention to the fact that by far the greater number of cases of neuritis with syphilis are unaccompanied by any brain-symptom whatever, and moreover that it is only when the trouble is due to syphilis that the most pronounced cases of choked disk run their course within a few weeks, with rapid return to the normal condition under the employment of specific remedies. There have been, moreover, a few cases reported of gummy infiltration of the optic nerve itself by Graefe, Hulke, and Barber.<sup>2</sup>

Westphal has also reported, as an example of gummy infiltration of an individual cranial nerve, a case in which the oculo-motorius had been changed into a gummy mass.<sup>3</sup>

I think, therefore, there is no doubt that the optic nerve may be affected primarily by the syphilitic taint, which may produce the symptoms of both kinds of neuritis; that is, the simple form already described in connection with retinitis, and the form known as choked disk, in which the predominant features are venous stasis with enlarged and tortuous vessels, protrusion of the papilla, œdema, and hemorrhage. That these affections, especially the latter, are more commonly the result of an intracranial trouble, such as diffused meningitis or concrete masses (gummata), is of course incontestable, but that they may be purely intraocular I have from my own experience no reason to doubt.

There is nothing distinctive between the ophthalmoscopic appearances of syphilitic and non-syphilitic neuritis. The origin, progress, and retrogression are also the same, with the exception that the course of the disease is shorter, and the **prognosis** is, as a rule, more favorable in the specific than in the non-specific form.

It should be constantly kept in mind that the amount of sight and the field of vision may be, and often is, perfectly normal in the most pronounced cases of choked disk, and that for this reason the practitioner must be doubly on his guard, so as to detect the trouble at the outset. Any complaint whatever in regard to the eye should at once demand a careful examination into all its parts and functions.

### Affections of the Vitreous.

It has already been pointed out, in the section on Choroiditis, that turbidity of the vitreous is a common accompaniment of inflammation of the choroid, but whether the vitreous is ever, under any circumstances, the seat of a primary inflammation is still a matter of discussion among ophthalmologists, and one which is hardly suitable to the character of the present work. I will say, however, that I have occasionally noticed in

<sup>1</sup> *Ophthalmic Hospital Reports*, vol. viii. pt. ii. p. 322.

<sup>2</sup> *Inaug. Diss.*, Zurich, 1873.

<sup>3</sup> *Jahresbericht Ophthal.*, 1873, p. 436.

young adults and those in middle life who have had syphilis a tendency toward troubles in the vitreous apparently unconnected, so far as the ophthalmoscope showed, with any trouble in the uveal tract. That such existed, but of too low a grade to be detected, is of course possible, and the disease in these cases would then be, as it is in the vast majority, a secondary, and not a primary, affection.

### Paralysis of the Nerves of the Eye.

A large proportion of the cases of paralysis of these nerves is due to syphilis. Graefe<sup>1</sup> attributes fifty in a hundred of all the cases met with to this cause, while others have placed it as high as 60 or 65 per cent. And it is this predominating frequency, and especially the marked and very curious predilection which the virus would appear to have in regard to certain particular nerves of the ocular group, which must be looked upon as the essential character of the disease. Thus, in most instances it is the third pair, or motor oculi, that is affected; next in order comes the sixth pair,<sup>2</sup> or abducens; and finally the fourth pair, or patheticus.

My limited space compels me to refer the reader to special treatises upon diseases of the eye for a detailed description of the symptoms and for the methods employed by ophthalmologists in diagnosis of these affections.<sup>3</sup> These are much too technical and intricate for the present work; still, the general practitioner should be aware of the most prominent symptoms as disturbances in vision, due to a want of co-ordination of the eyes, are often the initial, if not the sole, symptoms of commencing cerebral syphilis—a warning which, if neglected, often leads to a disastrous result, but which, if seized upon at the moment, allows the application of remedies with the most beneficial effect.

The principal symptoms of all these affections are loss of power in a muscle or muscles, and consequent limitation in the motion of the eye, shown by double images and strabismus. The individual characteristics are as follows:

*Third Pair.*—Falling of the lid, or ptosis; deviation outward of the eye, with loss of power upward, inward, or downward. Dilatation of the pupil, with loss or limitation of the accommodation.

*Sixth Pair.*—Deviation inward, with loss of power outward, and double vision on the temporal side of the median line of the affected eye.

*Fourth Pair.*—Double vision when looking at objects below the horizontal plane, and a peculiar inclination of the ground or floor, with an opposing inclination of the head of the patient to counterbalance the disturbance.

The paralysis, instead of being complete, may be limited to single muscles, from which it would appear that different branches of the nerve only were affected, or, instead of being an actual paralysis, it may be only a paresis. This “incompleteness” has been looked upon

<sup>1</sup> “Syphilitic Affections of the Eye,” *Deutsch. Klinik*, 1858, No. 21.

<sup>2</sup> Dr. Beyram has related three interesting cases of paralysis of the sixth pair due to syphilis (*L'Union médicale*, February 23, 1860).

<sup>3</sup> See an able article by Dr. Wells, giving an account of Graefe's researches upon paralytic affections of the eye, *Ophthalmic Hospital Reports*, vol. ii. p. 44. Also, *Diseases of the Eye*, same author.



by some as characteristic of syphilitic paralysis, and it is this condition which has led to the supposition that there was a "syphilitic vertigo." There is, however, nothing *sui generis* in this vertigo, which may occur from any cause, as it is usually only the expression of a want of co-ordination of the muscles. The latter may be so slight as not to produce any deviation of the axes, but be just sufficient to interrupt transiently the perfect co-ordination of the muscles and produce a dizzy sensation, but it may on some occasions produce for a moment actual double vision, especially when the gaze is turned in a particular direction. Still, it must be borne in mind that this want of co-ordination is not, as asserted by some, the only cause of vertigo in syphilitic patients, as it may exist and be exceedingly annoying even when the ocular muscles are not affected in the slightest degree. It must then be referred to an intracranial cause not connected with the organs of vision, but probably due to a morbid influence upon the semicircular canals. Among these limited paralyses, one of the most striking is that of monocular mydriasis, which may occur even without any implication of the accommodation of the same eye. It has sometimes been looked upon as a precursor of severe brain-trouble, but that it is often not so is proved by a number of syphilitic cases in which it has appeared and then disappeared with no intracranial symptom.

Besides these simple paralyses affecting a single nerve or some of its branches, there may be a coincident paralysis of the other nerves; thus the third and sixth pair, or the sixth and fourth pair, and so on, either in one or both eyes, may be affected, or there may be a triple paralysis, when, between the two eyes, the third, fourth, and sixth are all affected. The paralysis of the ocular nerves may be also associated with that of other nerves, notably the facial.

Owing to the great importance of these ocular troubles and their symptoms in regard to the early diagnosis of cerebral syphilis, praiseworthy attempts have been made to put the cause of their greater frequency in syphilitic affections upon an anatomical basis, the principal reasons for which are as follows: In the first place, the ocular nerves, before entering the orbit, run for a great distance along the base of the brain in contact with the investing membranes and bony surfaces, in a region which is the place of selection of all others for syphilitic inflammations and their products, such as neoplasms, gummata, and sclerosis, by which these delicate nerves may be surrounded and compressed; and especially does this refer to the third pair, which is even more apt to suffer than the rest from its relation to the interpeduncular space, which has been shown to be the seat of predilection of intracranial syphilitic hyperplasia.<sup>1</sup> But besides these changes, which lie at the base of the brain, modern investigation has shown, by clinical observation and by autopsies, that what have been called nerve-centres exist in the cortical substance of the brain, so that localized lesions in the gray matter may produce a paralysis of a nerve or its branches over which the particular centre presides. And, as disease of the cortex is frequently the result of syphilis, the connection between the lesion and the paralysis is a very probable one. This mode of origin would also explain the curious limitation of the paralysis to a

<sup>1</sup> *La Syphilis du Cerveau*, p. 372 et passim, 1879, par A. Fournier.

single muscle, instead of the entire group over which the nerve presides.

The surgeon should carefully avoid confounding paralysis of the sixth pair with converging strabismus. The two may readily be distinguished by the fact that, in the former, the patient is unable, under any circumstances, to turn the eye outward; while in the latter, if the straight eye be covered, the squinting eye resumes its normal direction.

The treatment of paralytic strabismus, resulting as it so often does from syphilis, is one of the most difficult problems offered to the ophthalmic surgeon, not only in regard to the fact whether, after all other remedies have failed, an operation should be done, but also as to the choice of the operation—whether, in fact, advancement of the paralyzed muscle with a tenotomy of the antagonist should be done, or a simple tenotomy of the opposing muscle, with the use of the suture, as proposed by Knapp, to increase the effect. I must again refer the general reader to special treatises on the subject,<sup>1</sup> merely remarking here that the effect of a tenotomy is often surprising, and that I have known a paralytic squint from syphilitic causes, which had resisted all the therapeutical means known to modern syphilographers, cured at once by a simple tenotomy.

Dixon<sup>2</sup> relates two highly interesting cases in which examination after death revealed the existence of tumors in the substance of the nerve. The paralysis is sometimes, though rarely, due to disease of the bony passages or their lining membrane traversed by the nerve, and has also been traced, upon post-mortem examination, to softening of the nervous or cerebral tissue. Virchow<sup>3</sup> quotes a number of cases dependent upon the last-mentioned cause.

### Hereditary Syphilis of the Eye.

That the effects of acquired syphilis in one generation may be transmitted to the following, and there manifest themselves in symptoms analogous to, though perhaps not exactly identical with, those of the acquired form, there can be little or no doubt. Thus the skin of the eyelids may be the seat of eruptive diseases, and the deeper-lying tissue the site of infiltrations or destructive secondary ulcerations, with or without a coexisting adenitis of the pre-auricular and submaxillary glands. Moreover, the hereditary syphilitic taint may manifest itself, so far as the eyeball itself is concerned, in every form of inflammatory action, from a muco-purulent conjunctivitis to keratitis, iritis, choroiditis, and even retinitis and neuritis, all of which have been described already under their appropriate headings. Indeed, so general and numerous are the varieties of ocular disease which the poison produces that it has been claimed that where the result was so general the cause could not be individual and specific; and it was consequently argued that when these various manifestations occurred in broken-down and debilitated constitutions they were due to the depraved condition of the general system,

<sup>1</sup> Among others, see a paper entitled "The Modern Operation for Strabismus," E. G. Loring, *Transactions of the New York Academy of Medicine*, 1874, p. 161.

<sup>2</sup> *Medical Times and Gaz.*, Lond., Oct. 23, 1858.

<sup>3</sup> *Syphilis constitutionnelle*, p. 129 et seq.

rather than the result of a particular morbid infection. Also, it was brought forward as a proof of this that in the vast number of troubles of the eye there were but two that had any claim to having any individual and characteristic features—specific iritis and keratitis; and that even these two forms of disease might occur, with all their so-called distinctive features, in cases in which there was not a trace of any hereditary taint whatever. The weight of evidence is, however, against such a reasoning and in favor of a definite and distinctive cause.

In the first place, these troubles occur in the hereditary varieties at a very early age, which in the non-hereditary forms only do so at a period very much later. And especially true is this with infantile iritis and other troubles of the uveal tract; and it may be laid down as a rule that the earlier a disease common to adult life makes its appearance, the more likely it is to be hereditary. Moreover, in favor of its hereditary nature is the frequency in which pre-existing disease of a syphilitic nature is shown to have occurred in one or both of the parents, as indeed is also the fact of coexisting manifestations in other parts of the body of the parents or child—manifestations which are peculiar to syphilis and not to struma or other diatheses, such as peculiar eruptions, erosive ulcerations, nodes, and fissures. To which may be added also the fact that it is the eldest child or the one born next subsequent to the infection of the parents which is markedly predisposed to be affected, the frequency of the attack and the force of the symptoms decreasing in the later-born children; and, finally, the peculiar physiognomy.

Such evidence as this, and much more of a similar character, has led syphilographers, notably Mr. Hutchinson, to believe and to declare that these ocular troubles, when occurring in young persons, are almost always the result of an hereditary taint due to a specific virus—a conclusion most important in a clinical point of view, as upon it the proper treatment depends.

## CHAPTER LXVIII.

### AFFECTIONS OF THE EAR.

#### Secondary Affections of the Ear.

**AURICLE.**—All of the cutaneous eruptions of syphilis are very rarely seen on the auricle. Rupp<sup>1</sup> saw the erythematous syphilide on both auricles, the eruption having been at the same time very marked all over the body, face, and forehead. Syenis<sup>2</sup> and Desprès saw a papular syphilide upon the lobule of the ear, the immediate exciting cause having been the opening made for an ear-ring.

*Gummata* of the auricle are exceedingly rare, and are generally

<sup>1</sup> *Journal of Cutaneous and Genito-urinary Diseases*, 1891, p. 367.

<sup>2</sup> *Arch. für Ohrenheilk.*, xxvi. p. 140.



accompanied by a simultaneous affection of the middle ear. Hessler,<sup>1</sup> Burnett,<sup>2</sup> Pollak,<sup>3</sup> Baratoux and Politzer<sup>4</sup> have recorded instances of gummata of the auricle. Gruber<sup>5</sup> says that gummata occurring in this region are seen most often on the mastoid process. In Burnett's case the gummata spread over the entire auricle, and formed deep-seated ulcers and partially destroyed the auricle. There generally is a simultaneous affection of the middle ear.

**EXTERNAL AUDITORY CANAL.**—Ravogli and Buck say that the syphilitic affections which have been most frequently observed in the external auditory canal are condylomata and ulcers. But these also are very rare. Thus, Kipp<sup>6</sup> saw condylomata affecting the external ear on 2 in 16,000 ear-patients. Among 3976 ear-patients Buck<sup>7</sup> observed only 3 with condylomata in the external auditory canal. Desprès met with condylomata and ulcers in this situation 4 times among 1200 syphilitic subjects, 980 of whom had condylomata in other parts of the body. Rupp saw condylomata in the external auditory canal 3 times only in 4000 ear-patients. Tröltzsch<sup>8</sup> speaks of broad moist condylomata of the external auditory canal. Stöhr<sup>9</sup> saw 14 cases of condylomata of the external auditory canal in three years. Zucker<sup>10</sup> saw only 1 case of condylomata of the external auditory canal among 2000 ear-patients. Desprès's<sup>11</sup> observations are instructive in this connection. He saw among 2000 syphilitics, 980 of whom had mucous patches in other parts of the body, only 5 with mucous patches of the external auditory canal. The disease appears to be more common among females. In the majority of instances one ear only is affected; however, as Knapp's<sup>12</sup> case shows, both canals may be involved. It is almost the rule for condylomata of the external auditory canal to be complicated with purulent inflammation of the middle ear, and this affection of the middle ear generally precedes the condylomata of the external auditory canal.

The **diagnosis** of condyloma of the external auditory canal may at first be attended with some difficulty, as gradually increasing redness, followed by swelling, which is seen in the beginning of condyloma may be due to a furuncular affection of the canal.

Diffuse inflammation of the external auditory canal has been observed by McBride.<sup>13</sup> Ladreit de Lacherrière states that he has seen it often, and that it occurs frequently with the secondary stage, and usually attacks simultaneously both canals. There is only moderate swelling, the skin is red and cracked, and the discharge very offensive. McBride, on the other hand, states that in his case there was no disagreeable discharge or odor. Kipp has also seen such a case, and it

<sup>1</sup> *Arch. für Ohrenheilk.*, xx. p. 242.

<sup>2</sup> *Treatise on the Ear*, 2d ed., 1884, p. 222.

<sup>3</sup> *Allgem. Wiener med. Zeitung*, 1881, No. 20.

<sup>4</sup> *Treatise on the Ear*, 1894, p. 201.

<sup>5</sup> *Treatise on the Ear*, 2d ed., p. 374.

<sup>6</sup> *Reference Handbook of Med. Sciences*, vol. v. p. 276.

<sup>7</sup> *American Journal of Otolary*, 1879, p. 25.

<sup>8</sup> *Lehrbuch*, 4th ed., p. 93.

<sup>9</sup> *Arch. f. Ohrenheilk.*, vol. v. p. 131.

<sup>10</sup> *Arch. f. Otol.*, vol. xiii. p. 243.

<sup>11</sup> *Annales des Maladies de l'Oreille, etc.*, vol. iv. p. 311.

<sup>12</sup> *Arch. of Otolary*, vol. viii. p. 165.

<sup>13</sup> *Glasgow Med. Journal*, Sept., 1885.

occurred many years after infection, and was associated with non-purulent inflammation of the middle ear, with caries of the superior maxillary and palatine bones of the same side. The pain was very great, and not relieved by deep and long incisions, which at no time liberated pus. The Eustachian tube was almost impermeable. After much and long-continued suffering the pain subsided eventually while the patient was taking potassium iodide, but complete deafness remained.

**EXOSTOSIS OF EXTERNAL AUDITORY CANAL.**—We have no convincing proof that syphilis ever causes exostosis of the external auditory canal. Gruber is the only author who believes that syphilis has anything to do with the formation of these growths.

**MEMBRANA TYMPANI.**—Lang<sup>1</sup> has seen a syphilitic papule on the drum-membrane.

**MIDDLE EAR.**—Any affection of the throat may spread to the middle ear; therefore extension of a syphilitic inflammation to the throat is not uncommon. The result of extension of an inflammation of the throat to the middle ear may be a catarrh, with swelling of the mucous membrane of the Eustachian tube, a collection of serum or mucus in the drum-cavity, or a purulent inflammation resulting in perforation of the drum-membrane. There is, however, in this condition nothing characteristic of syphilis. In syphilitic affections of the throat it is not uncommon for the ulceration to extend to the cartilage of the Eustachian tube, destroy some portion of it, and cause contraction or closure of the tube. It has been shown that primary chancroidal ulcers occur at the pharyngeal opening of the Eustachian tube, and that this process gives rise to a catarrhal inflammation in the middle ear, resulting in thickening and sclerosis of the mucous membrane or hyperostosis of the bony wall and ossicles, or in suppuration. The labyrinth is frequently involved in these cases.

**Symptoms.**—Although there is nothing characteristic in the subjective and objective symptoms of the diseases of the middle ear which occur in syphilis, it has been thought that the symptoms were those to which Schwartze called attention many years ago (1869)—*i. e.* that in syphilitic acute catarrhal inflammation an impairment in the conduction of sound through the bones of the skull occurs regularly at an early period of the disease—but he gives no explanation for the cause. This symptom, however, is often absent, and the bone-conduction may remain unimpaired throughout. The acute form of catarrhal inflammation of the middle ear associated with syphilis is only rarely independent of any disease of the nasopharynx; therefore careful search should be made with the rhinoscopic mirror for some form of ulceration of the pharynx. Nor has chronic aural catarrh occurring in a syphilitic any sign by which it can be distinguished from non-syphilitic catarrh. Pain may be absent throughout its course. Tinnitus is a pretty constant symptom. The hearing is variously affected. In some instances the middle ear is profoundly affected early in the disease, so that after a few months only loud speech is heard. In another class of cases years may elapse before the hearing is seriously affected.

**Pathological Anatomy.**—Moos<sup>2</sup> has described the pathological changes

<sup>1</sup> *Vorlesungen über Path. und Therap. der Syphilis*, 1885, p. 431.

<sup>2</sup> *Archives of Otolaryngology*, vol. iii. pp. 107 et seq.

found in a case of deafness believed to be due to syphilis, but the same changes have been observed in non-syphilitic diseases; there is, therefore, so far as we know, nothing characteristic in the pathological anatomy in this connection.

**PURULENT INFLAMMATION OF THE MIDDLE EAR.**—Ulceration of the mucous membrane, with caries and necrosis of the walls of the tympanic cavity, the mastoid process, and petrous portion of the temporal bone, and facial paralysis, have been frequently observed, and many such cases have terminated fatally through intracranial complications; but the same conditions exist with non-syphilitic suppuration in the middle ear. If pain in the ear is complained of in constitutional syphilis, we will generally find that it is caused by disease in this part. However, pain in the ear may be independent of inflammation. Under such circumstances the absence of all objective signs of middle-ear diseases will enable us to reach a correct diagnosis.

**EUSTACHIAN TUBE.**—Mucous patches may occur in any part of the nasopharynx, and this condition not infrequently extends to the tubal prominence.

**MASTOID PROCESS.**—Schwartz believes that osteosclerosis and hyperostosis of the mastoid process may sometimes be caused by syphilis. The same writer declares that superficial and extensive caries of the outer cortex of the mastoid process, without disease of the middle ear, is met with only as the result of syphilitic or scrofulous periostitis. There are no signs by which we can differentiate between syphilitic and non-syphilitic forms of disease in this part. Thus, gumma of this region may present the clinical picture of periostitis of the mastoid process.

**INTERNAL EAR.**—Syphilitic affections of the internal ear are much less common than those of the external ear. Politzer<sup>1</sup> has seen syphilitic disease of the labyrinth develop on the seventh day after the primary infection. This experience is very rare, because the disease occurs more frequently toward the end of the secondary stage. In one of Politzer's cases the disease in the middle ear occurred simultaneously with gumma on the head twenty-one years after the primary affection. Kipp has seen a case in which sudden and absolute deafness of one ear occurred in connection with nasocranial osteitis twenty-six years after infection, and after an interval of more than twenty-five years of complete freedom from all symptoms of constitutional syphilis. The disease of the labyrinth may also accompany a catarrhal or purulent inflammation of the middle ear which has preceded the syphilitic affection. There can be no doubt that the disease of the labyrinth sometimes occurs independently of extension of the middle-ear affection, but this is unquestionably less frequently the case than that the labyrinth is secondarily affected.

**Pathological Anatomy.**—Schwartz, who is the most distinguished authority in this particular field of inquiry, declares that we have no anatomical knowledge whatever on this subject, and that the pathological changes found by Toynbee, Gruber, Moos, and others cannot be regarded as characteristic, since the same changes occur in non-syphilitic cases. Moreover, there has generally been, in the cases reported, some other general systemic disease present which may be responsible for the ana-

<sup>1</sup> *Text-book on Diseases of the Ear*, edited by Dalby, 1894, p. 645.



tomical changes found in the labyrinth. Thus, in Gruber's<sup>1</sup> case in a syphilitic subject who had become suddenly deaf, and who died from typhus fever, there was found considerable hyperosmia of the lining membrane of the tympanic cavity and of the membranous labyrinth, which appeared much thickened. The fluid in the labyrinth was abundant in quantity and of a blood color. In a syphilitic subject in whom intense subjective noises, attacks of vertigo, and headache suddenly commenced, without much disturbance of the hearing, marked deafness having set in only shortly before death, Moos<sup>2</sup> found at the autopsy condensation of the periosteum of the vestibule, the foot-plate of the stapes raised and immovable, the connective tissue between the membranous and osseous labyrinth infiltrated with small cells, Corti's arch and cells especially considerably infiltrated, the zona pectinatæ and the periosteum of the lamina spiralis ossea less strongly infiltrated; the ampullæ and membranous semicircular canals were alike greatly infiltrated; the auditory nerve was normal. Huebner, Baratoux, and Kirchner have found a typical endarteritis luetica in the blood-vessels of the tympanic mucous membrane, lens-shaped osseous accretion from the periosteum on the promontory, and the formation of cavities in the walls of the labyrinth, which were due to obliteration of the vessels.

**Symptoms.**—Objective examination of the drum-membrane often gives a negative result, but should middle-ear disease be present the symptoms indicating this condition will be observed. The subjective signs will show marked diminution or total loss of hearing in one or both ears, occurring more or less suddenly. Subjective noises are generally present. Double hearing, according to Roosa, is rarely observed. Pain is an uncommon symptom. Politzer observed in only one case pain in the interior of the ear, with tinnitus and deafness, and without any objective evidence of inflammation on the membrana tympani. Attacks of vertigo and unsteady gait more frequently follow than precede the deafness. The deafness is, in most cases, bilateral, and one ear is usually much more affected than the other. Inflation of the middle ear has little or no influence on the hearing-distance. Perception of sound through the bones of the head is either greatly diminished or quite wanting.

**Course and Termination.**—The impairment of the hearing may progress slowly in some cases, but generally it is rapid. The deafness may sometimes be almost complete on the third day after the commencement of the trouble (Politzer). The unsteady gait generally disappears after a few weeks or months, but the impaired hearing continues. When improvement in the hearing takes place it is gradual, and the restoration of the hearing is never, as is its loss, sudden.

**Diagnosis.**—The diagnosis of labyrinthine syphilis can only be made through the history or the presence on the body of evidence of active syphilis. Politzer states that in young people the rapid development of the disturbance of hearing, with the absence of objective symptoms of an affection of the middle ear, is sufficient to raise the suspicion of labyrinthine syphilis.

**DISEASE OF THE COCHLEA.**—Roosa<sup>3</sup> believes that we may classify

<sup>1</sup> *Lehrbuch der Ohrenheilkunde*, 2d ed., p. 202.

<sup>2</sup> *Arch. für Path. Anat.*, etc., vol. lxix. p. 313.

<sup>3</sup> *Treatise on Diseases of the Ear*, 7th ed., 1891, p. 633.

disease of the cochlea. He prefers to say "disease of the cochlea" instead of the labyrinth when the prominent symptoms are great impairment of hearing, inability to hear certain tones, and the production of false ones. These, he believes, are evidences of cochlear disease.

AUDITORY NERVE.—We have no knowledge of the morbid changes in the trunk of the auditory nerve due to syphilis.

### Inherited Syphilis.

According to Hutchinson and Jackson, the ears are affected in 10 per cent. of all children with inherited syphilis. The middle ear, as in the case of adults suffering from syphilis, is affected with the same forms of disease—*i. e.* catarrhal and purulent inflammation. Baratoux,<sup>1</sup> who made autopsies in 43 still-born or new-born infants with hereditary syphilis, found lesions of the middle ear 23 times, lesions of labyrinth 4 times, and lesions of both parts 12 times. According to Politzer, those forms of syphilitic affections of the labyrinth are to be regarded as hereditary which develop in children with great or total deafness. Kipp has published a series of cases in which the disturbances of hearing caused by hereditary syphilis were combined with parenchymatous keratitis. The writer has treated a case of inherited syphilis in which the ear-affection developed three years after recovery from the parenchymatous keratitis.

The **symptoms** given by Kipp were—sudden deafness, vertigo, disturbance of equilibrium, subjective noises, nasopharyngeal catarrh, and sometimes also catarrh of the middle ear. Hinton states that the disturbance of hearing frequently occurs first at puberty.

**Prognosis.**—The prognosis is less unfavorable in recent cases, but it is unfavorable in all cases of any standing. The prognosis is most favorable in those cases in which the middle ear is affected, and for which local treatment may be applied.

**Treatment.**—The cutaneous lesions of syphilis which may invade the auricle and external auditory canal require the treatment employed for similar lesions in other parts of the body. Thus, in a case of chancre near the pharyngeal orifice of the Eustachian tube observed by Cohen, in which there was considerable destruction of tissue, in addition to constitutional treatment iodoform was applied locally. Condylomata of the external auditory canal had been successfully treated with mercurials, the ear being cleansed by syringing and the meatus washed with a 1 per cent. solution of nitrate of silver, and calomel dusted over the excrescences.

**Middle Ear.**—Suppuration of the middle ear occurring in syphilis requires constitutional and local treatment. The local treatment must be determined by the local changes in the ear and the nature of the attack. If the attack be an acute one, the pain and congestion in the ear may be relieved by the application of two or more leeches to the tragus, and if the mastoid region be red and tender, leeches to this part are also indicated; but this complication may call for radical treatment. If the drum-membrane be bulged forward by fluid in the drum-cavity, the drumhead should be incised and the fluid removed by inflation through the Eustachian tube by Politzer's method. When the fluid in the middle ear is purulent, it should be removed by syringing. The selection of the solution for syring-

<sup>1</sup> *Transactions of the International Med. Congress*, Washington, Sept., 1887.

ing is not very important, as it is used chiefly for its mechanical effect of removing the secretion. Clean, warm water, freshly boiled, to which 1 per cent. of cooking salt or 3 per cent. of boric acid is added, makes an efficient cleansing solution. The temperature of the solution should be about 85° Fahr. Carbolic acid, 1-2 per cent., may be used when the discharge is offensive. The amount of secretion should determine the number of times a day the syringing should be repeated. When the discharge is very slight one syringing in twenty-four hours may suffice; when profuse, the syringing may be repeated three times in a day. After the syringing the ear should be inflated through the Eustachian tube by Politzer's method, and the meatus *thoroughly dried* by means of absorbent cotton wrapped about the end of a dentist's cotton-holder. A good cleansing agent is hydrogen peroxide in 6 per cent. solution. This simple treatment applies to those cases of suppuration of the middle ear in which no granulations or polypi are present in the drum-cavity or caries of the temporal bone. Localized suppuration of the external attic, with perforation of Schrapnell's membrane, will call for special treatment, which can scarcely be defined within the limitations of this chapter. The treatment of the labyrinthine syphilis is the same as that of general syphilis. The iodide treatment is sometimes attended with improvement in the hearing. In other cases, however, mercurial inunction is more efficient. Muriate of pilocarpine, used subcutaneously (2 per cent., four to ten drops and increased), has been useful in the hands of some surgeons.

Buck<sup>1</sup> has tabulated his experience in the treatment of the sudden deafness due to syphilis with large doses of potassium or sodium iodide. In the favorable cases the improvement began to show itself as early as during the second or third week of the iodide-of-potassium treatment. The treatment was begun with 30 grains a day, and gradually pushed to the extreme limits mentioned—viz. 270 gr., 315 gr., 360 gr., 525 gr. Buck adopts the rule of not giving more than from one to two drachms daily in those cases in which commencing improvement is observed during the second or third week of treatment.

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## CHAPTER LXIX.

### TERTIARY SYPHILIS.

WHEN syphilis does not become extinct in the secondary stage it passes into a chronic condition, generally called tertiary syphilis, which is designated by French authors *tertiarism*.

The evolution of tertiary syphilis, as a rule, is slow, uncertain, insidious, and unattended by local or general prodromata. While in secondary syphilis the infection very often runs an orderly course, and a general estimate may be formed as to what morbid conditions and lesions may be

<sup>1</sup> *Transactions of the American Otological Society*, 1884, p. 243.



expected or feared, in tertiary syphilis, as a rule, there are no special criteria to govern us in our prognosis, since all is occult and without order or system. The tertiary stage has very aptly been called the *terra incognita* of syphilis.

Tertiary syphilis presents in its evolution and course many striking differences from the secondary form. Tertiary lesions, as a rule, are of deep development, of compact structure, and of slow and aphlegmasic nature. They are usually less numerous and more isolated than secondary lesions, less certain as to their seat, less regular in their course, and much more deeply seated and destructive in their tendency.

Tertiary lesions attack the subdermal and submucous connective tissues, and produce in them more or less extensive and dense infiltrations, most of which show a tendency to degeneration. While in secondary syphilis the more superficial strata of the skin and mucous membranes are involved, in the tertiary stage the whole thickness of these structures is attacked. In secondary syphilis the skin lesions are more generalized, more numerous, and are symmetrically placed. In the tertiary stage their number is restricted; they are usually irregularly distributed, and very often their arrangement is unsymmetrical. The old eruptions are localized to one region, and they may perhaps exist in several.

In secondary syphilis we not infrequently see a tendency in the lesions to undergo involution and resolution; in tertiary syphilis no tendency to spontaneous retrogression of its lesions is, as a rule, seen. While in the majority of cases of secondary syphilis the viscera are spared or are only the seat of irritative or hyperæmic processes, in tertiary syphilis they are attacked more or less deeply by a chronic progressive infiltrative process which produces nodules, plaques, and tumors called gummy tumors or syphiloma. Thus in its far-reaching and chronic pathological action tertiary syphilis involves not only the superficies of the body, but also its internal parts—the viscera, the bones and their adnexa, the muscles, the blood-vessels, and the nervous system.

Tertiary syphilis therefore runs a long, indolent, and aphlegmasic course, with little, if any, inherent tendency to resolution; but, on the contrary, there is a predisposition to produce ulceration, sloughing, gangrene, thrombosis, necrosis, a sclerotic condition of the tissues, and sometimes cicatrization not preceded by ulceration.

The pathological processes in tertiary syphilis are, in the main, similar to, but more fully developed, intense, and exuberant than, those of the secondary stage. They include, in brief, perivascular cell-changes, round-cell infiltration (gummatous infiltration and nodulation), and irritative processes which result in the development of fibrous or connective tissues (in bones, joints, muscles, tendons, synovial sheaths, and the skin and mucous membranes), and last, but not least, the excessive development of connective-tissue neuroglia in the nervous structures of the cerebro-spinal axis. These processes may eventuate in the degenerative conditions already mentioned.

It is absolutely impossible to write a clear and thoroughly systematic clinical history of tertiary syphilis, since no two cases are alike, and the date of invasion, the extent, depth, course, and seat of the morbid process, and the organs or tissues attacked, are usually different in each instance. While, therefore, no sharply and precisely drawn clinical divis-

ions can be presented in describing tertiary syphilis, certain generalizations may be made, based on the study of my own cases and supplemented by the experience of many able men, which will tend to give a clear idea of this chaotic and discordant stage of syphilitic infection.

Tertiary syphilis in a rather small proportion of cases develops more or less precociously. In some cases as early as the second, third, or fourth month of the infection, when the roseolous syphilides or the papular syphilides are still present, the condition of the patient takes a turn for the worse. The skin lesions increase in size, ulcerate, and suppurate, perhaps very profusely. The resulting ulcers increase in size and depth, and may present sloughy, even gangrenous, features. Then these lesions show a tendency to spread over the trunk, the extremities, the face, and the scalp. With these ulcerations cutaneous gummata, or more superficial but thick tubercles, may develop, soften, and lead to deep ulcers. The patient then becomes weak and cachectic. In a small proportion of these cases such nervous affections as hemiplegia, aphasia, meningeal hyperæmia, epilepsy, paralysis of the motor oculi and facial nerves, and degenerative changes in the optic and auditory nerves, may be seen. This form of tertiary syphilis in very rare instances runs an unusually rapid and severe (called by some galloping or lightning-like) course, and soon ends in death, which is due to a decidedly febrile state and marasmus. These cases sometimes present distinct features of septicæmia. In this very early form of tertiary syphilis we find multiple large and severe disseminated and generalized ulcerations, and an adynamic condition of the system, shown by the malignancy of the infection and a tendency to ulceration, gangrene, and phagedæna. In these cases the syphilitic infection seems to exuberantly luxuriate, and its action is like wild-fire.

Many of these cases of precocious tertiary syphilis are cured after a hard struggle by good treatment and good hygiene.

Tertiary syphilis may be rather less precocious than in the form just described. Toward the end of the first year of the infection, after the evolution of secondary manifestations, some patients become weak, anæmic, and lose flesh. One, several, or many ulcers, which may arise *de novo* or follow in the wake of a secondary lesion, may appear on the scalp, the face, or the extremities, and run an active and rapid course, showing great rebelliousness to local and general treatment and good hygiene. In some of these cases there are concomitant bone, joint, pharyngo-nasal, and testicular lesions. The patient is and continues to be a sick man upon whom destructive lesions seem prone to appear at short intervals. In most of these cases, after a very severe ordeal, the patient gradually gains health and strength, and may be in the end cured. In these early forms of tertiary syphilis it is not very uncommon to observe the onset of pulmonary tuberculosis, which usually ends fatally in a few weeks or months.

Fournier's<sup>1</sup> experience goes to show that nervous disturbances are second in order of frequency of symptoms in precocious tertiary syphilis. According to this observer, the brain is most commonly affected, and the spinal cord less frequently.

The spinal cord is much less frequently affected than the brain in

<sup>1</sup> "Le Tertiariisme précoce," *Gaz. méd. de Paris*, Nos. 49-52, 1893, and No. 1, 1894.

precocious tertiary syphilis, but the changes produced have a malignant tendency. According to Fournier, Gilbert and Lion observed 16 deaths in the 52 cases of early medullary syphilis.

Death from brain and spinal-cord lesions is to be feared in early tertiary syphilis. It will be generally found that precocious tertiary syphilis is much more rebellious to treatment than the late form is. In many cases treatment seems to have little if any effect.

In 3032 cases of tertiary syphilis Fournier observed its precocious development in 158 patients.

The results of the experience of many observers go to show that the onset of tertiary syphilis occurs in the third or fourth year<sup>1</sup> of the infection in the majority of cases, and that from this date until the tenth or twelfth year its appearance is progressively less frequent. Tertiary syphilis may, in exceptional cases, develop from the twelfth to the twentieth year. After the lapse of two decades tertiary syphilis very rarely occurs. In 3600 private cases of tertiary syphilis Fournier<sup>2</sup> observed its development in 177 at periods beyond the twenty-first year. Between the twenty-first and the twenty-sixth years 115 cases were noted, whereas between the forty-first and fifty-first years there were only 4 cases recorded.

It is well to emphasize the point that the possibility of error in the diagnosis of very late tertiary lesions is very great, and that errors are very common. It is always a good plan to be skeptical about alleged cases unless they are unqualifiedly vouched for by an accurate and skilled observer. Many cases presenting lesions of tuberculosis, actinomycosis, mycosis fungoides, sarcomatous and epitheliomatous hyperplastic tumors, gout, rheumatism, traumatism, and iodide-of-potassium intoxication have been paraded as evidence of the activity of the syphilitic virus ten, twenty, thirty, forty, and fifty years after infection.

The statistics of Haslund<sup>3</sup> are very interesting as to the percentage of occurrence and the frequency with which various organs, systems, and tissues are attacked in tertiary syphilis. In 6364 cases of syphilis (3490 in men and 2874 in women) there were 454 cases of tertiary syphilis in men, or 13 per cent., and 337 cases in women, 11.7 per cent. These statistics are very much in accord with those of Rollet, Mauriac, Vajda, and Jullien.

Parts attacked.	In 454 cases of men.	In 337 cases of women.
Skin . . . . .	in 235 cases,	in 218 cases.
Nervous system . . . . .	" 144 "	" 56 "
Osseous system . . . . .	" 104 "	" 108 "
Mucous membranes . . . . .	" 72 "	" 79 "
Internal organs . . . . .	" 40 "	" 7 "

It will be seen that the integument is the tissue most commonly attacked in tertiary syphilis, and that next in frequency the nervous system is involved. In 3429 private cases of tertiary syphilis Fournier found

<sup>1</sup> "According to the computation of Jullien (*Récherches sur l'Étiologie de la Syphilis tertiaire*, Paris, 1874), the average date of invasion in a large number of cases was four and a half years.

<sup>2</sup> "Des Étapes ultimes de la Syphilis," *Bull. médical*, Nos. 33 and 34, 1894.

<sup>3</sup> "On the Causation of Tertiary Syphilis," *British Journal of Dermatology*, vol. iv., 1892, pp. 210 et seq.



nervous affections in 1085. Second to cutaneous lesions, nervous disturbances are most frequent up to the twentieth year of infection, and after that date they are very rare. Syphilitic myelopathies are very rare in the late years of syphilis.

Concerning these late evolutions of tertiary syphilis, it may be said that in many cases they were preceded by other tertiary lesions more or less remotely in the majority of cases. In very exceptional cases there has been no antecedent tertiary manifestation whatever.

While it is impossible to describe sharply-marked type-forms of tertiary syphilis, a generalization of cases may be made.

Cases of ulcerating tubercular syphilide are sometimes seen in which the lesions begin in the third or fourth year, sometimes earlier. I have seen some rare cases in which these syphilides invaded in persistent and interrupted outbreaks the scalp, the face, the extremities, and the trunk, producing disfigurement and perhaps mutilation in all parts attacked. Thus, the disease kept on, in spite of good treatment, for years; then, after an interval of ten years of apparent health, gummatous infiltration and ulceration occurred, and the skin became necrosed at slight traumatism. In these cases syphilis leaves its permanent morbid impress, with a tendency to hyperplasia and ulceration of the skin, for years. In some occult way a peculiarly active vulnerability is engrafted on the tissue.

Then, again, we see cases in which resolute tubercular syphilides appear on one region and remain limited to it for a long time, and in the course of ten or twenty years attack most of the integument of the whole body. In these cases of extensive chronic skin lesions the patients may enjoy fairly good and seemingly robust health. In some cases intercurrent nervous, visceral, osseous, and testicular affections develop. I think, however, that in general the nervous system is usually spared in these cases of extensive tegumentary invasion.

Perhaps one of the most frequent forms of tertiary syphilis is that in which the serpiginous syphilide develops upon some specific lesion or on some simple ulceration or traumatism, and travels over certain regions or over the trunk or the extremities. Patients thus attacked may be thin and weakly, or even robust and well-built. This lesion, to my mind, indicates rather that the skin of the patient remains vulnerable to microbic invasion than that it is an evidence of the activity of the syphilitic diathesis.

Some cases of late osseous lesions present a tolerably uniform course. Thus, we see that nodes appear on the skull and long bones, and develop in crops at irregular intervals for years. In some of these cases there is coexistent joint lesion, and in some men testicular involvement. In some of these bone cases there is often severe and persistent rheumatism of the muscles or fibrous tissues and a markedly cachectic condition. These patients look sallow and unwholesome; their facies bears the stamp of suffering; they suffer from malnutrition and from insomnia the result of pain. In these cases the morbid condition is very chronic, and it is very rebellious to treatment.

There is a further class of cases of tertiary syphilis which present a tolerably well-defined course. The patient suffers in the secondary period with rashes and meningeal symptoms, and on their disappearance a condition of somewhat impaired health supervenes. This may

last years, and then the patient may be attacked by gummata of the skin, bones, or testes, or he may develop some hyperplastic or arterial, brain, or cord affection, which may be cured, may leave him a cripple, or it may kill him.

Cases are not at all of infrequent occurrence in which, after a faint and ephemeral or a well-developed roseolous syphilide, an interval of seemingly perfect health of a few or many years may occur, and then cutaneous, osseous, testicular, visceral, or cerebro-spinal symptoms may develop.

It is not at all uncommon, particularly in women who have had a more or less severe ordeal in the secondary stage, to observe in the second and third, and even later years of the infection, the onset of cachexia and a gummatus infiltration into the hard or soft palate, which may produce much destruction of tissue. Very commonly these are the only lesions, but in some cases skin and bone gummata are found to co-exist.

After this lugubrious recital of these grave and malignant morbid conditions, due to tertiary syphilis, it is pleasant to state that in the majority of cases one or more regions and one or several organs or tissues may be attacked, and after a time, under the influence of treatment, a cure is induced.

Though tertiary syphilis is severe and often threatening in its course, fortunately for the human race it is, as a rule, amenable to treatment in a marked degree.

It is claimed by some authors that tertiary syphilis is not true syphilis, but a chronic morbid condition left behind by the active infection. Other authors think that in tertiary syphilis the tissues have undergone some changes, and, instead of reacting normally to any stimulus, they produce a peculiar growth of cells known as gumma. Seeing that tertiary lesions may coexist and follow directly in the wake of secondary manifestations, that the pathological processes of the whole disease show a distinct gradation and an intimate correlation, it is hard to see how syphilis can stop short and then develop a radically different morbid condition. Clinical observation and pathological researches show very conclusively that in the early part of this infection the hyperæmia is moderately active, and that the cell-proliferations are exuberant and widely scattered. In the late stages, on the contrary, the cell-growth is slow and insidious, and shows a tendency to become localized deeply in the tissues of regions and organs, and at the same time the hyperæmia is very sluggish.

It is hard to explain the late onset of connective-tissue proliferation in the cerebro-spinal axis, in the testis, and viscera on any other ground than that a morbid predisposition or impress has been engrafted on the vessels and cells of these parts in the period of activity of the infection, and that later on, owing to some stimulation, injury, or perhaps excess of function, the new cell-growth is inaugurated.

### Ignored Syphilis.

It is not at all uncommon in clinics and hospitals, and also, though less frequently, in private practice, to see cases of tertiary syphilis in

which no history of primary or secondary lesions can be obtained, even after very rigorous cross-questioning. These cases are classed under the heading of "ignored syphilis" by Fournier,<sup>1</sup> and under that of "syphilis occulta" by Fleiner.<sup>2</sup> As an example of the frequency of occurrence of ignored syphilis it may be mentioned that in a five months' service at the St. Louis Hospital, Fournier saw 28 cases, and that Lassar<sup>3</sup> in 200 cases of late syphilis, in 60 (about 30 per cent.) no evidence of the early stages could be obtained.

Ignored syphilis is observed in women much more frequently than in men, and in ignorant and careless persons of the lower walks of life it is far from uncommon. Many women have but the most elementary ideas regarding syphilis, while men, as a rule, are quite well informed upon the subject. In many women the initial lesion is extragenitally placed, and its true nature and that of its sequelæ are never known to them. Then, again, by many women the genital chancre is not seen, or it is so insignificant in appearance and mild in character that its gravity is not appreciated. I have seen several cases of intelligent physicians who had undoubted primary syphilitic lesions on their fingers, and whom it was impossible to convince that they were the victims of syphilitic infection. The chancre in some men is so insignificant and short-lived that it is looked upon as a chafe or as herpes.

Owing to their mild character and ephemeral course the early syphilides in some cases pass unobserved or unappreciated. It is very common in clinics and hospitals to call a patient's attention to a roseolous or a papular syphilide on his or her body, of which he or she had no knowledge or suspicion.

Then, again, in many cases the inguinal adenopathies may pass unobserved, or, if their existence is known, the patient is ignorant of their import. Mild primary and secondary syphilis are the usual unrecognized forerunners of tertiary syphilis.

Many women and children have syphilis, and suffer severely from it, yet they know nothing of the nature of their disease. It often happens, as Fournier very aptly says, that "in women syphilis is the more likely to remain ignored, since all that is possible is done to hide the nature of the disease from them. The husband or the lover entreats the surgeon to treat his victim without revealing to her the cause of her malady; and amidst this 'conspiracy of silence' she becomes cured of her *syphilis ignorée*."

In some cases for various reasons patients utterly deny having had primary and secondary syphilis.

Errors in diagnosis on the part of physicians not infrequently lead patients to think that they never had syphilis.

It follows, therefore, that we shall constantly meet with cases of tertiary syphilis in which the lesions or symptoms are so strikingly pathognomonic that no doubts as to their nature can be entertained, yet in which no evidence of early infection is at all obtainable.

With the foregoing facts in one's mind, it seems strange that at this late day the old-time syphilis-d'embrée idea should be entertained by any

<sup>1</sup> *Gazette des Hôpitaux*, Aug. 8, 1878.

<sup>2</sup> *Deut. Arch. für klin. Med.*, 1891, pp. 292 et seq., vol. xlviii.

<sup>3</sup> *Berl. klin. Wochenschr.*, No. 29, 1892.



one, yet here is what Lassar<sup>1</sup> says: "Syphilis can creep into the system without establishing itself in the usual manner at the point of entrance. An individual primary lesion under any circumstances means syphilis, but syphilis does not always require a tangible initial focus to be received into the lymphatic system. Every single irregular sexual intercourse, even in the absence of a marked primary symptom, may become the occasion of infection."

Klotz<sup>2</sup> advances the startling hypothesis that primary and secondary syphilis are caused by one parasite, and that there is a "secondary parasite, which is similar to the bacillus of tuberculosis which can indefinitely remain in the organism in a dormant condition until called into activity by some accidental irritation. It then produces the tertiary gummatous manifestations, but not the diffuse chronic visceral affections, like tabes, general paralysis, etc., which are the result of intoxication with the toxins of the primary parasite. The secondary micro-organism is inoculable like the bacillus tuberculosis, and produces lesions identical with tertiary syphilis, but not primary syphilis. Tertiary syphilitic manifestations may therefore be due to direct inoculation, without the necessity of a primary or secondary stage."

**Etiology of Tertiary Syphilis.**—Long essays have been written on the etiology of tertiary syphilis, but the essential facts can be very briefly stated. Any depraved condition of the system may cause the secondary period of syphilis to be prolonged and to be followed by tertiary manifestations. Then, again, the tissues of some persons seem to be so profoundly affected by syphilis that the infection runs its full course in them. By far the most potent and frequent cause of tertiary syphilis is the absence or the insufficiency of treatment. This statement almost sums the case up. Marschalko,<sup>3</sup> in an exhaustive study of 673 cases of tertiary syphilis, states that, as a result of good treatment, tertiarism was only found in 2.7 per cent., whereas in badly-treated cases it was 19.3 per cent., and under insufficient treatment it reached as large a figure as 23.9 per cent.

The secretions and tissue-detritus of precocious and quite early tertiary lesions contain infectious qualities, while those of very late lesions are probably inert. We cannot, to-day, say positively when syphilitic lesions lose their power of infecting healthy persons.

<sup>1</sup> *Berl. klin. Wochenschr.*, 1892, pp. 718 et seq.

<sup>2</sup> "On the Occurrence of Tertiary Lesions of Syphilis as the Result of Direct Local Infection, with general remarks on syphilis as an infectious disease," *Journal of Cutaneous and Gen.-urin. Diseases*, July and Aug., 1893.

<sup>3</sup> "Beiträge zur Aetiologie der tertiären Lues, etc.," *Archiv für Derm. und Syph.*, 1894, pp. 225 et seq.

## CHAPTER LXX.

## THE TERTIARY SYPHILIDES.

**The Gummatous Syphilide.**

THIS syphilide is almost invariably a late lesion, and, although usually invading the skin, it always begins in the subcutaneous connective tissue. It consists of tubercular infiltrations, some as small as a pea and others several inches in diameter. When great extent of tissue is involved, the lesion is usually composed of several tumors merged together. This is not always the case, Fournier having reported a single tumor fourteen centimetres in length, eight to ten in breadth, and from two to six in thickness. Unlike other syphilides, in which the specific neoplasm is diffused, this lesion is a true circumscribed tumor.

This syphilide is particularly prone to appear in parts where the connective tissue is loose and abundant. It may be limited to the connective tissue, but on invading the skin it usually ulcerates. In the former case we apply to the syphilide the term *gummosus* or *gummosus tumor*; in the latter case we call it a *gummosus ulcer*.

The progress of the lesion varies according to the condition of the parts upon which it is developed; in thick and copious adipose or cellular tissue the tumors may remain a long time without attacking the skin; under contrary conditions or above a bony surface implication of the skin is early and the bone itself may be eroded superficially or deeply. Sometimes the muscles are exposed by complete destruction of superjacent tissues. Blood-vessels, nerves, and sometimes bursæ may be involved by extension of the lesion.

We shall study this syphilide in its three stages—of tumefaction, of ulceration, and of repair. (For the description of precocious gummata see page 642.)

In the first stage we find from one to six small tumors, which appear simultaneously or in succession and run an indolent course. In exceptional cases, when the eruption appears during the early years of syphilis, the tumors may be numerous, their invasion quite rapid, and the attendant local and general symptoms well marked. Cases have been reported in which there were twenty, thirty, and even forty tumors, and Lisfranc has recorded one instance in which there were one hundred and sixty. When they appear early they are, as a rule, numerous and symmetrical; when occurring later the reverse is true.

These small tumors are painless and attended by slight tenderness. Their growth is generally slow. At first they are freely movable; they soon become attached to the surrounding tissues, especially when seated over bony surfaces or in regions where the connective tissue is scanty. They give to the finger a sensation of moderate firmness, retaining their shape under pressure, having neither the elasticity of a fatty tumor nor the hardness of scirrhus. In many cases they tend to invade the skin rather than the deeper tissues. Their superficial growth is first shown by slight reddening of the overlying skin, which rapidly becomes thickened and less supple. Finally, we observe a tubercular infiltration, round or

oval in shape, perhaps slightly elevated, of a deep coppery-red color, and surrounded by a well-marked hyperæmic areola. They may remain in this condition for many weeks, or even months, and, still under treatment, undergo resolution. Generally, however, their firm structure slowly breaks down, until finally fluctuation may be detected. In many cases the soft, yielding character of the tumor gives a false impression that pus is confined beneath the skin. On incision of such a tumor a small quantity of thick, bloody fluid escapes and a soft mass is found, but no cavity like that of an abscess. In case of true fluctuation, however, there is an actual cavity containing fluid resulting from disintegration of the tumor. Surgical interference is, however, seldom required. The cavity, in most cases, opens spontaneously, either like a furuncle by a single aperture or by ulceration at several distinct points.

The minute changes leading to this condition are of interest. The immediate product of the death of the subcutaneous neoplasm is a thick, gummy mass, the intermingled pus being supplied by the surrounding parts, which are secondarily inflamed. The destructive process goes on very slowly until after the occurrence of ulceration. The small ulcers first formed are deep and sharply cut; they extend in all directions, until the destruction of the entire neoplasm results in the formation of what may be called a typical gummous ulcer. Such an ulcer is either round, oval, or gyrate from fusion of the small ones, and sharply cut as if punched out. Its floor, which is greenish-red or sometimes greenish-black, is uneven and bathed with sanious fetid pus. The edges of the ulcer are thickened, and around them is generally an extensive areola of hyperæmia, which may be so persistent as to give the impression that it also is the seat of gummatous infiltration.

The **course** of such ulcers varies with the care they receive. Sometimes they take on phagedenic action, invading extensive surfaces and causing profound or even fatal cachexia. They may remain in an indolent condition for months, discharging a foul secretion, showing no reparative tendency, and inducing great œdema of surrounding parts. Groups of ulcers may be found connected by narrow bands of reddened and detached skin, whose nutrition is but feebly sustained by the superficial vessels; hence, these bands soon melt away and expose the subjacent ulcerating surface.

The depth of the ulcers depends largely upon the thickness of the original infiltration. In some cases the gummy deposit is confined to the cellular tissue just below the papillary layer of the skin, and the resulting ulcer is relatively shallow. In other cases it is more deeply seated below the derma, and may be exposed by scraping off the upper layers.

In its early stage the tissue of the gumma is of a reddish-yellow color and has a soft consistence; at a later period it looks dry, firm, grayish-red, and non-vascular. The changes in its appearance are largely due to gradual compression and obliteration of the blood-vessels. Repair can never take place until complete removal of this tissue, which must be hastened by local as well as general treatment. The progress toward cure is especially slow where the surface of muscles has been exposed and when the destructive action has extended even to the tissues of the inter-muscular septa.

Under **treatment** the foul surface of the ulcer is supplanted by granu-

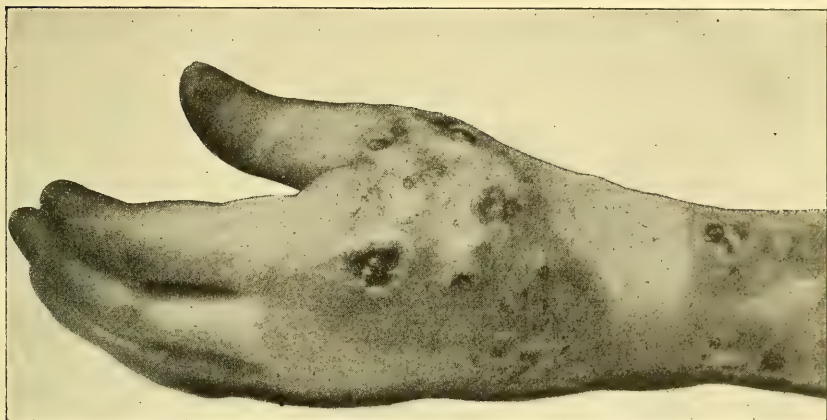


lations which eventually cicatrize. Sometimes these granulations become exuberant and rise above the normal level. As the ulcer heals the surrounding redness, which on the legs may be of a purple tint, gradually diminishes, and, when the cicatrix is formed, there remains a dull coppery areola which may persist for many years.

The cicatrices of gummous ulcers differ according to the depth of the destructive process. When the ulceration has been superficial the scars are slightly depressed, thin, parchment-like, and of a dead-white color. All such cicatrices become blanched from their centre outward.

The cicatrices of deep ulcers are much depressed, and often very uneven, owing to fibrous bands and nodules. Some are also peculiar in being adherent to the deeper parts. In case the gummous ulceration has involved the superficial portion of the bone, the cicatrix adheres as firmly

FIG. 213.



Gummatous infiltration over the wrist and dorsum of the hand.

as did the periosteum to the osseous surface. In other cases where much destruction of bone has occurred no cicatrix at all is formed, the eroded surface being surrounded by a firmly-attached fibrous band which represents the margin of what might have been a cicatrix.

This syphilide may appear on the scalp, on the face, particularly about the mouth and nose, and also on the neck. It attacks the extremities, generally near the joints (see Fig. 213), and those parts where the integument is soft and the connective tissue abundant; the palms and soles therefore escape. It invades the back oftener than the anterior aspect of the trunk, and is seldom seen on the lower part of the abdomen.

Gummy tumors present certain peculiarities in different regions of the body, and may be complicated by intercurrent morbid processes. Erysipelas may attack the ulcers, especially when seated on the head or extremities. The oedema which accompanies gummous ulcers of the leg may be so severe and chronic as to induce a condition similar to elephantiasis Arabum. Again, in various parts of the body the appearance of the ulcers may be totally changed by a serpiginous or phagedenic process.

Gummy tumors of the scalp are seldom isolated and movable; usually the entire integument is thickened, and, although at first movable over

the bones, soon becomes adherent. Small ulcers form at follicular openings, and gradually increase in size. Sometimes the outer table of the skull is destroyed, and in other cases the whole thickness of bone becomes necrosed; the dura mater, however, resists the destructive action in a remarkable manner, and is rarely involved. The scalp over the frontal and parietal bones is most commonly attacked, and not infrequently the forehead, chiefly toward the median line, is invaded. The secretions from ulcers occurring in the latter situation sometimes accumulate between the bone and the integument, and produce much swelling in the supraorbital regions. The eyes may become closed by swelling of the lids caused in a similar way. A more serious complication of these ulcers of the scalp is erysipelas, which in some instances, as already stated, may excite reparative action.

Upon the face we find both the movable, subcutaneous tumor and the infiltration which involves the deeper layers of the skin. Such swellings, being discovered here earlier than in other regions, usually receive treatment soon enough to prevent their reaching an extraordinary size. In neglected cases, however, the infiltration may be very extensive. Cazenave has reported an instance in which the face was so distorted as to be unrecognizable, having a leonine expression as in elephantiasis Græcorum. Bidon<sup>1</sup> calls this condition diffuse hypertrophic syphiloma of the face, in preference to the term leontiasis syphilitique proposed by Goutard.<sup>2</sup> This syphilide is dangerous by reason of the sclerotic and cicatricial conditions which it may leave. I have seen a case in which the nose, lips, and chin were excessively hypertrophied. The peculiarities of this syphilide in the stage of tumefaction are similar here and elsewhere, except that about the lips and nose it sometimes has a cartilaginous hardness. Gummata of the lips have been carefully described by Tuffier,<sup>1</sup> who in an extended study found that true gummata and a resulting sclerosis are the most common late lesions of these parts. The gummata are nodular and lumpy, and movable in the upper lip, and are found in the form of plates in the lower lip. In these cases a mistake for cancer is liable to be made. Cancer begins superficially in a crack or little lump. These labial syphilides distort the countenance very much. Hyperæmia is soon seen, and the progress toward ulceration is quite rapid. The resulting ulcer has the peculiarities of similar syphilitic lesions in other regions. The crusts, which frequently form, have a greenish-black color. About the nose much destruction is often produced, either limited to the skin or involving the cartilage and the bones. Erysipelas may complicate gummous ulcers of this region, and in rare cases phagedæna, which has been known to destroy the greater part of the face.

The gummatus syphilide of the arms and forearms is not especially peculiar, but in most cases, when it is seated over nerves, severe neuralgias are produced. In somewhat rare cases gummy deposits in the fingers produce a swelling resembling that occurring in a specific lesion called *dactylitis*. Although prone to appear near the joints, this syphilide seldom invades the articulations themselves. In one case, however, a gummous tumor over the sterno-clavicular articulation ulcerated, destroyed the joint,

<sup>1</sup> *Thèse de Paris*, 1886.

<sup>2</sup> *Ibid.*, 1878.

<sup>3</sup> "Gommes et Scleroses syphilitiques des Lèvres (Labialites tertiaires)," *Rev. de Chir.*, vol. vi., 1886, pp. 777 et seq.

and perforated the lung, death resulting. In another case a gumma the size of a hen's egg was developed in an intercostal space, eroded the bone, and perforated the pleura. The liability to this accident in the case of gummata situated on the side of the thorax should lead to the adoption of very vigorous treatment.

Gummata are very important clinically, for they are so frequently mistaken for sarcomatous tumors and removed with the knife. Von Langenbeck<sup>1</sup> reports the case of a man having a tumor of the size of the fist on the scapula, which had been diagnosticated as a lipoma, and was sent to him for operation. It disappeared under specific treatment. He also speaks of a case of a tumor of the size of a pigeon's egg seated in the internal border of the sterno-mastoid muscle, which was extirpated, and was later on followed by gummata of the pharynx, tongue, and cheek. Von Langenbeck himself removed a tumor of the size of a goose's egg from the groin, where it had contracted adhesions with the large vessels. The patient died, and the microscope showed that the neoplasm was a gumma.

Von Langenbeck also speaks of a case of sublingual tumor which was a gumma, but diagnosticated as carcinoma. Also two cases—the one a gummy tumor of the tongue, and a similar tumor over the biceps muscle—which, after the diagnosis of cancer had been made, were dissipated by specific treatment.

These facts should be kept prominently in mind by surgeons.

As showing the size and extent of some gummy tumors the case of De Amicis<sup>2</sup> is very interesting. It was that of a man fifty-eight years old who had been syphilitic twenty-three years. In nine months this tumor extended from the axillary line to the spine, and was 23 centimetres long, 21 wide, and 10 in thickness. This mass was composed of round and oval nodosities, not painful even on pressure, which were movable over the ribs and covered with a partly adherent integument which was ulcerated in one spot. This tumor disappeared in two and a half months under the influence of specific treatment. Ferrara<sup>3</sup> also records an interesting case by reason of the seat of the lesion. It was a tumor of the size of a pigeon's egg, and seated in the abdominal wall. This lesion developed very slowly, but disappeared rapidly under treatment.

Gumma not infrequently form in the female breast, less commonly in both breasts. The importance of their diagnosis is here very great; failure to recognize their true character may lead to unnecessary surgical interference. They appear, as elsewhere, slowly; they are only moderately hard, and are painless. There is no retraction of the nipple, and the axillary glands are unaffected. The ulceration which occurs is characteristic and quite unlike the indurated, fungoid ulceration of cancer. In all cases of limited tumors of the breast a suspicion of their gummatous character should be entertained, especially when the patient is young or of middle age. A mistake is liable to occur only when the gumma is very large and of unusual depth.

The cellular tissue of the buttocks being very copious, gummata of the gluteal regions often attain remarkable size and depth. I have seen

<sup>1</sup> "Ueber Gummi Geschwülste (granulome syphilome)," *Arch. für klin. Chir.*, vol. xxvi., 1881, pp. 265 et seq.

<sup>2</sup> *Il Morgagni*, April, 1890.

<sup>3</sup> *La Medicina contemporanea*, June, 1887.



several instances in which the sharply-cut walls of the ulcer led down to a base four inches from the surface of the skin. The genitals and thighs are very apt to be attacked by these tumors, which, upon the penis, scrotum, and labia majora, are often almost ligneous in consistence. The perineum is sometimes the seat of circumscribed gummy deposit. I have seen one case in which urethral fistula resulted from ulceration of a gumma in this region.

Little need be said of gummy tumors of the thighs beyond the fact that they are often of very large size. When they occur on the legs the question of diagnosis is particularly interesting. The ulcerating gummy tumor is usually seen on the upper and middle thirds of the leg, and where the connective tissue is abundant, differing markedly from simple ulcers, which most commonly form on the lower third and over a bony surface. They may appear lower down, but usually where the tissues are lax, and seldom over a bony surface. They are often multiple, but more than eight are rarely observed. They select the sides of the leg rather than the posterior aspect. They are always surrounded by intense hyperæmia, and frequently, late in their course, they resemble non-specific ulcers, especially the varicose. Their edges become rounded and callous, and their surface is studded with granulations, thus losing their characteristic features.

Gummata may be situated in almost any region over a nerve, and may then cause pain. Ricord reports one case in which a gumma of the size of a chestnut, seated in the groin, caused pain in the crural nerve, and another in which two such tumors, seated in the course of the ulnar nerve, provoked severe pain in the forearm and in the two inner fingers. Nélaton reports two cases: in one a gumma of the axilla, besides causing neuralgia in the whole arm and shoulder, produced by compression a *souffle* in the axillary artery, venous stasis, and œdema of the extremity. The tumor speedily subsided under the use of iodide of potash. The second case was that of a lady who had consulted several physicians on account of pain in the foot, which was found by Nélaton to be caused by a gumma compressing the plantar nerves. In a case seen by Fournier two gummata were found, one upon the median and the other upon the radial nerve, each of which was the cause of pain, numbness, and muscular weakness. In another case, seen by the same author, a small gumma over the track of the supraorbital nerve gave rise to considerable pain.

The extensive hyperæmia which usually accompanies these ulcers of the leg is the cause of localized œdema. In very chronic and extensive ulceration the œdema begins about the ankle and involves a portion or the whole of the leg, which becomes swollen, hard, and brawny, the integument above the ankle being thrown into the folds. This condition, which is very obstinate and altogether resists internal treatment, resembles elephantiasis Arabum. When their edges become thickened and callous these ulcers do not extend rapidly, but persist for many years. Their base is covered by a layer of greenish-black slough, and from it exudes a thin, fetid, bloody secretion.

Phagedæna is happily an infrequent complication of this syphilide. In broken-down subjects the ulceration rapidly destroys the skin and subjacent tissues, sometimes even denuding the bones. The process is extremely painful, and is attended by constitutional reaction, which some-

times reaches a typhoid condition. The parts most subject to this complication are the face, feet, and genitals. Unless promptly checked there may be great destruction of tissue.

This syphilide may appear within the first year of syphilis, but it is generally a late symptom, appearing at any time from the third to the fifteenth or twentieth year. Fournier reports a case of gummy tumor of large size which was developed fifty years after infection, and was cured by iodide of potash.

The **prognosis** is influenced by the date of the appearance of the syphilide, its extent, and the general condition of the patient. Its early and malignant appearance indicates an active and severe form of syphilis, in which visceral gummata are to be feared. Although only one or two gummous tumors or ulcers may be present and the general health is not much affected, thorough internal treatment is none the less necessary.

The **diagnosis** is to be made in its stages of tumefaction and of ulceration. When it exists as a movable, subcutaneous tumor, it may be mistaken for a fibrous, a sarcomatous, or a fatty tumor, or perhaps an enlarged ganglion. The syphilitic lesion is usually multiple, and is not compressible like the fatty tumor nor as hard as the sarcoma. Sarcomata tend to attach themselves to subjacent parts; the gummy tumors invade the skin. The history of the case, the absence of pain in the tumor, and its situation may be of assistance. Tumor-like infiltrations upon the face, in the female breast, about the genitals, near joints, and wherever connective tissue is abundant should always, in case of doubt, be subjected to specific treatment. Numerous cases have occurred, particularly with French surgeons, in which mixed treatment has dissipated tumors condemned to excision.

The general appearance, situation, and history of gummatous ulcers are generally sufficient to establish their character; but sometimes, especially on the face and lower extremities, they may be confounded with ulcerating lupus or with simple eczematous or varicose ulcers. Lupus begins as small tubercles of the skin, which slowly ulcerate and become partially incrustated, and it extends by the formation of new tubercles, which in turn ulcerate. Lupus usually begins in early life and on the nose.

Eczematous ulcers are always preceded by eczema of the skin, which lies tense over a bony surface. They are painful, superficial, always accompanied by a good deal of inflammation, and are seated, as a rule, on the lower third of the leg. Similar general features are observed in varicose ulcers, together with enlarged veins and more or less œdema.

Subcutaneous nodular infiltrations which resemble in nearly all their features gummata are sometimes seen, particularly in weakly and so-called strumous subjects. These nodules, called *erythème induré des scrofuleux* by Bazin, and *gommes scrofuleuses* by Besnier,<sup>1</sup> may be of the size of a pea or of a hazelnut or walnut, and they may exist in the form of diffuse plaques. They run a chronic course, they contract adhesions with the skin, and they may lead to ulceration. In all particulars these lesions as to physical appearances, site of development, and course resemble syphilitic gummata. They occur most frequently in young subjects, and

<sup>1</sup> *Annales de Derm. et de Syph.*, 1883, pp. 257 et seq. See also an essay by T. Colcott Fox, *British Journal of Dermatology*, Aug. and Oct., 1893.

rather rarely in older persons. They are influenced by antisypilitic treatment. In these cases no history of syphilis can be obtained.

### The Tubercular Syphilide.

FIG. 214.



Early generalized and copious tubercular syphilide.

This syphilide consists of deeply-seated, circumscribed infiltrations into the skin, resembling in appearance the large, flat, papular syphilide, and being, in reality, nothing more than an exaggerated form of the latter lesion. The whole thickness of the skin is involved, whereas in the papular syphilide the deeper layers escape; the latter is a secondary manifestation, while the tubercular syphilide is a tertiary lesion.

The tubercular syphilide seldom ulcerates, but disappears by interstitial absorption; hence it has been called *non-ulcerative* or *resolutive*.

The resolutive tubercular syphilide may appear even before the second year of syphilis; it is usually developed between the third and sixth years, but may be seen as late as the eighth or tenth year, and, according to some authors, even as late as the fifteenth or twentieth. It is usually met with in cases that have not been thoroughly treated at the outset. Its course is very chronic and marked by numerous relapses, many years passing while it travels over the body. It causes no pain, heat, or itching, but merely produces thickening of the skin. When it appears early it may form a general and copious eruption (see Fig. 214), but later the tubercles may be limited in number and confined to a single region.

The tubercles begin as deep-red spots, which slowly increase in size and thickness until, when fully developed, they have a diameter of from half an inch to an inch. Sometimes they are as small as a split pea, and again they are more than an inch in diameter. Their surface is flat or rounded, and their borders are sharply defined. The smaller lesions are more elevated and rounder than the larger. Upon the face they often have a shining appearance, and on parts where the epidermis is thick and rough they look dull and dry. The color of the tubercles is at first dark-red, with possibly a tinge of



crimson, but frequently it is of a light pinkish red. Their surface is usually quite smooth and free from scales, but sometimes a layer of small size and quite adherent is seen. Where the epidermis is thick the proliferation is occasionally free, giving the tubercles somewhat the appearance of psoriasis.

The tubercles first appear on the forehead or back of the neck near the scapulæ. They may be limited to these regions or may invade the trunk, always more copiously on the back and over the gluteal regions. In front they are generally scattered, but in some cases they occur in large numbers over the sternal region, on the borders of the axillæ, and over the deltoid muscle. They are more copious on the outer aspects of the extremities near the joints than on the inner. The backs of the hands and feet may be spared, but tubercles are sometimes developed on the palms and soles, and soon pass into a scaling condition.

The **course** of the eruption is very slow; several weeks or even months and years may pass before the entire body is covered. When the eruption is general the tubercles are usually disseminated without order, rarely showing a tendency to circular distribution. Fresh crops often fill the interspaces of those first developed. When precocious the eruption may be very copious. In several of the cases I have seen of recurrence of this eruption the tubercles were almost in contact with each other. Such cases are rare, and belong to the group of malignant precocious syphilides.

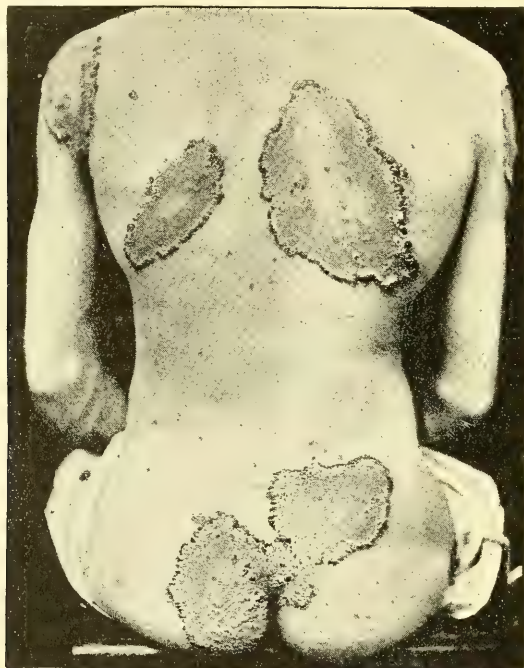
An eruption of tubercles is likely to be general when occurring within two years after infection and in those who suffer from a severe form of syphilis or who have been improperly treated during the early months. Far more commonly several regions are successively invaded.

These tubercles are prone to appear in an irregularly triangular group, with the apex at the glabella and the base near the margin of the scalp. They may form a sort of corona in the latter regions, with sometimes a number on the scalp itself. On the face they sometimes run together and form patches. Again, several tubercles on the nose blend together and extend to the cheeks, forming a butterfly-shaped patch. When the tubercles spread in a rapid manner, a distinctly elevated margin or rim is formed, the enclosed patch being depressed. In this serpiginous form the whole face may become invaded. The centre of the patch gradually loses its color and becomes thinner, until in bad cases a cicatricial tissue is left. This process is usually rapid, and then slight destruction of the skin results; when it is slow more or less atrophy of the skin is produced. In one of my cases, in which resolution was rather rapid, the patient's face was covered by tubercular rings, which merged together, the enclosed spaces being normal. Some authors call this the *serpiginous tubercular syphilide*, but I prefer to reserve that name for an eruption which is serpiginous by ulceration. This may very properly be called the annular tubercular syphilide. (See Fig. 215.)

These tubercular rings are not seen in all cases; in some the lesion extends merely at certain portions of its margin. Thus, kidney-shaped growths are produced, or new tubercles may form and finally coalesce around the entire periphery of the patch. Tubercular patches seated on non-hairy parts are smooth, while those developed in regions supplied with hair are often uneven and warty. The latter condition is due to fusion of the tubercles and excessive prominence of the follicles and

papillæ. Their surface may be covered with a crust of serum and epidermis, or the scanty pus may dry between the numerous elevations. Cases of invasion of the entire scalp in this way have been recorded, and doubtless many of the cases of frambœsia of the old writers were nothing more than aggravated instances of this vegetating or papillomatous tubercular syphilide. It has been stated that the papular syphilide may undergo a similar metamorphosis. We have, therefore, two kinds of *syphilide végétante* or *papillomateuse*, which differ merely in degree—a

FIG. 215.



Annular tubercular syphilide.

papular and tubercular. The head and face are most commonly attacked, but the trunk about the shoulders, over the sternum, and in the inguinal and gluteal regions may be invaded. When this syphilide is thus altered in character its course is even more chronic than usual. The papillomatous or vegetating appearance of this form of tubercular syphilide is due to the exuberant new cell-growth in the papillæ, which become greatly hypertrophied. (See Fig. 216.)

Several peculiar features are presented by this syphilide when occurring on the face. In some instances a thin yellow crust, which is quite adherent, covers the smooth, shining surface of the tubercles. This may be so thick as to be mistaken for pus resulting from ulceration. In very chronic cases it may form a rim around the margin of the tubercle, the enclosed surface being quite scaly. The skin generally retains its suppleness, although its entire thickness is involved by the infiltration; but in some cases, especially about the nose and on the lips, it becomes as

hard and unyielding as cartilage. Much annoyance is caused by the immobility of the parts and by the hideous deformity which often results. In extreme cases the skin of the entire face may become thus affected. Although a severe lesion and often very rebellious, the effect of proper treatment in causing absorption of the infiltration and in restoring the natural softness of the parts is frequently astonishing. Where this com-

FIG. 216.



The late variety of the vegetating syphilide, showing its annular form and its serpiginous tendency.

plication has existed for a long time the effect of medicine may be less rapid.

These tubercles, especially on the face, and exceptionally elsewhere wherever the integument is soft and thin, sometimes undergo colloid degeneration. When this occurs the color of the tubercle slowly changes to a dull brown, the lesion becomes less resistant, and on incision a soft, gluey, non-diffuent mass is revealed. Such a tubercle is rather more elevated than others, and appears as if infiltrated with glue. This condition is most frequently seen on the forehead. Usually these colloid tubercles slowly subside by absorption of the cells, leaving a depressed cicatrix.

Next in frequency to the face, the shoulders and forearms are the parts attacked by the tubercular syphilide. Sometimes these parts are primarily invaded.

In the early years of syphilis the tubercles are usually disseminated over the body, but at later periods successive groups appear at long intervals in different regions. The eruption may thus continue for many years, the general health deteriorates, and visceral lesions may be developed. Not infrequently this syphilide becomes localized about the buttocks, and there remains in a sluggish condition, and the surface of the patch be-

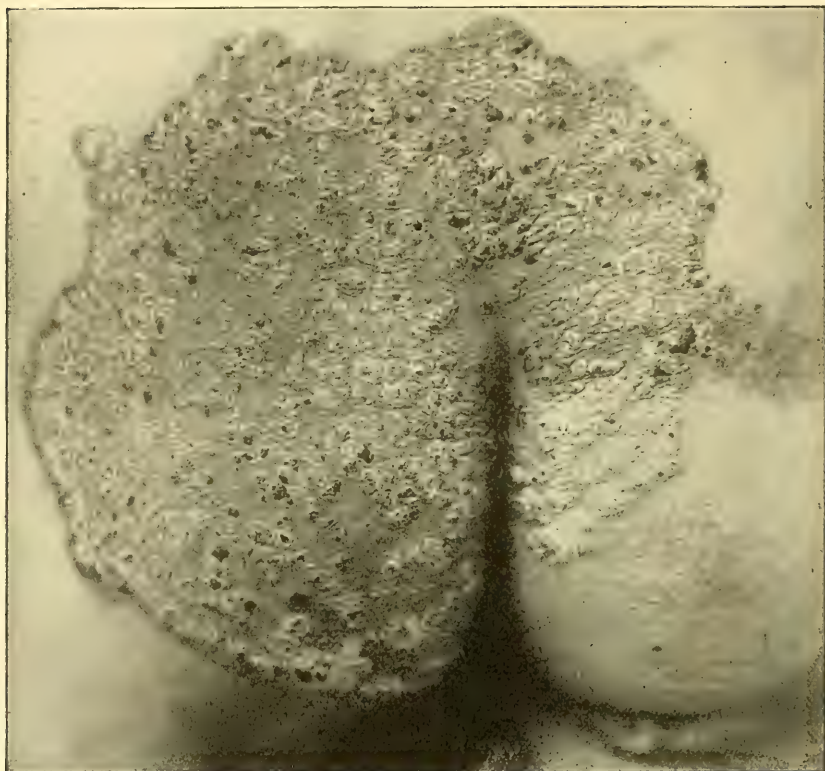


comes unevenly covered with tenacious scales, giving the lesion the appearance of psoriasis. This is well shown in Fig. 217.

The **course** of the eruption depends almost altogether upon treatment. In its early stages it will usually be dispersed by vigorous measures. A limited relapse is very likely to occur in case of inadequate treatment.

In no other syphilitic eruption can a **prognosis** be made with equal

FIG. 217.



Tubercular syphilide, forming a large area and covered with scales.

confidence. If untreated, it will probably invade nearly every part of the integument. I have seen two cases in which more than six hundred tubercles formed during a period of about ten years, leaving permanent cicatrices upon the face and body, particularly on the posterior aspect and on the extremities. Although the alæ of the nose and the lobes of the ears were destroyed, not a particle of ulceration had ever occurred. The atrophy which follows this eruption probably results from some occult change in the normal cells induced by the presence of the infiltrating cells. It is certain that the infiltration and the tissue framework which holds it degenerate and are absorbed at the same time.

In case of a relapse a group of pustules is usually observed in some one particular region. When the tubercles are scattered over the body we may be sure that the period of infection has been within two or three years. When the eruption is early it is usually symmetrical, but when

late it is often unsymmetrical. The tubercles are usually less copious with each succeeding outbreak, but, on the contrary, cases are occasionally met with in which their size and number are about the same with each relapse. The face, back, and forearms are the most frequent seats of relapses. In some cases the face, and exceptionally the scalp, is attacked by recurring tubercles until most of its integument is left in a cicatricial state.

After full development the course of these tubercles is slow and without marked features, and they are generally amenable to treatment. When they retrograde they sometimes first sink in the middle, and may thus be converted into tubercular rings. If left alone, they remain unchanged for months. Their red tinge gradually fades to brown; they flatten and finally disappear, leaving a pigmented spot. This syphilide may pass away without causing disorganization of the skin, especially if treated early. Upon the face and where the tissues are soft and delicate cicatrices are apt to result. Hence the necessity of active and prolonged treatment. Tubercles that have remained on the face, uninfluenced by treatment, for two or three months, almost inevitably leave cicatrices. On other parts of the body they may remain longer without leaving any deformity, but, as a rule, atrophy of the skin follows when they have lasted three months.

In some cases this syphilide ulcerates, the process usually being limited to a portion of the eruption. This may occur in a malignant and precocious manner, ulcers forming with great rapidity. Happily, such cases are rare. When ulceration attacks a tubercle a yellow crust forms on its surface, which soon covers the whole tubercle and attains considerable thickness. Its color gradually becomes greenish black, its surface is rough, and it is surrounded by a dull-red or even livid areola. Underneath, and coextensive with the crust, is a smooth ulcer, with a foul, grayish-red surface, sharply-cut edges, as if "punched out," and perhaps a little undermined, secreting an ichorous pus. The progress of the case varies in different patients. In broken-down subjects, especially from alcoholism, the ulcers may extend and merge together, forming large patches. Under favorable conditions the destructive process is more limited, but such ulcers are invariably followed by depressed cicatrices. The face, thighs, and forearms are the parts most frequently attacked. On the face particularly they are very destructive and leave unsightly scars.

Strange as it may seem, the cicatrices following resolute tubercles are often as well marked as those subsequent to deep ulceration. When resolution has occurred without any damage to the skin, coppery pigment spots remain for a time. When a cicatrix is formed, it is always deeply pigmented and surrounded by a similar areola. These cicatrices form very slowly. After complete absorption of the lesion the tissue is tolerably thick, but it gradually becomes thinner and less brown, until in about a year there remains merely a soft, glistening membrane, either perfectly smooth or perforated with minute holes, the seat of follicles. Very often a narrow coppery areola remains for a long time. When the ulceration has been particularly deep and extensive, and especially when it has occurred near a joint, thick and long fibrous bands sometimes traverse the scar, and in some cases its surface is studded with tubercles of false keloid. The occurrence of these neoplasms has been considered

diagnostic of lupus. As a matter of fact, they are developed as well, though less frequently, on syphilitic cicatrices.

The prognosis of this syphilide is good, although it indicates an active and persistent form of syphilis. Early treatment may prevent or modify cicatricial deformity, which otherwise may be extensive. Persistence in treatment will also prevent or postpone relapses.

Ulceration, complicating this eruption, calls for the exercise of the greatest skill and care. In addition to the use of proper internal and local treatment, the nutrition of the patient should be improved by every possible means. In those rare cases in which ulceration and gangrene attack the tubercles the outlook is very bad; the destruction of tissue may be extreme, cachexia may appear, and a typhoid condition, resulting fatally, may be induced.

This syphilide, when occurring in the secondary period, often coexists with lesions of the intermediary stage, such as perionychia, alopecia, iritis, cerebral affections, testicular lesions, mucous patches, and condylomata. Later on it is generally accompanied by a varying degree of cachexia and sometimes by visceral lesions.

**Diagnosis.**—This syphilide is to be diagnosed from lupus vulgaris, elephantiasis Græcorum, carcinoma, and psoriasis. Lupus generally begins in early life, and is never so diffusely scattered as the tubercular syphilide. The resemblance is seldom striking except when the latter is limited to the face. Lupus-tubercles are usually more irregular in outline and deeper than those of syphilis. They are pinkish-red rather than brownish-red, as in the latter disease. Lupus-tubercles are more commonly studded with small colloid masses and are prone to ulcerate. The scars left by lupus are not soft and thin as in syphilis, but are hard and seemingly adherent to the subcutaneous tissues. The crusts of lupus are not so regular and round as those of the tubercular syphilide, and have not their peculiar dark, greenish-black color. The underlying ulcers are not as deep, smooth, and sharply cut as those of syphilis.

In some cases of true leprosy tubercles occur which resemble in size, shape, and color those of syphilis, but they are usually accompanied by white, anæsthetic patches, large spots of brown pigmentation, nerve-swellsings with perverted sensations, large nodular infiltrations and ulcerations, or other manifestations which characterize leprosy.

Although superficial carcinomatous tubercles may somewhat resemble those of syphilis, they are never so scattered, and are always much larger, sometimes involving an entire region.

The tubercular syphilide occasionally presents two appearances which resemble psoriasis. The first is when the tubercles are covered with an unusual number of scales, especially on the outer aspect of the arms, where psoriasis is prone to appear. The second is when the tubercles undergo involution and form rings. Psoriasis, however, is a disease beginning in youth, and is essentially scaly. The tubercles of syphilis are infiltrations, and, though some may be covered with scales, others will be found free from them. In syphilis, again, we have the history of the case and perhaps other manifestations of the disease. In rare cases in which the eruption is limited and the history obscure mercurial treatment settles all questions, since it cures a syphilide and does not influence psoriasis.



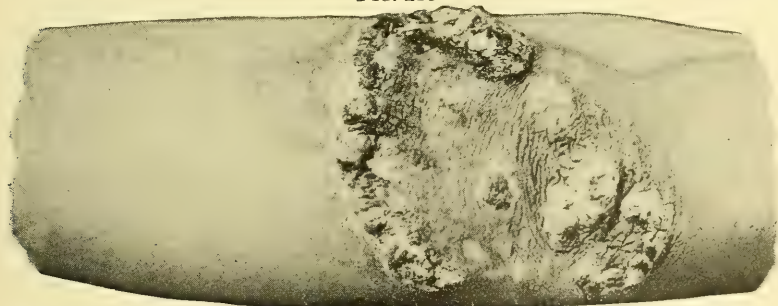
Some authors call this syphilide *lupus syphiliticus*, a term inapplicable for reasons already given.

### The Serpiginous Syphilide.

This syphilide creeps over large surfaces by ulcerating at the periphery of patches while it heals in the centre. It may occur as early as the second or as late as the tenth or fifteenth year of syphilis, possibly later. Its course is very chronic, and, although unattended by pain, it frequently causes great inconvenience. Its effects on the skin may be slight or it may leave disfiguring cicatrices. There are two varieties of this lesion, a superficial and a deep.

The *superficial serpiginous syphilide* begins as a pustule, generally of the impetigoform or of the variolaform syphilide. In its early stage it consists of a superficial ulceration, which has no characteristic features indicative of its future course, but which extends in the shape of a round or oval patch. If treatment, and particularly local treatment, is not employed, the process continues and crusts form until the patch reaches a diameter of about two inches; granulations then spring up from the centre, and the crust falls off except at the periphery, where it adheres as an encircling ring. Thus is formed not a continuously incrustated surface, but a ring of crusts enclosing a more or less hyperæmic area of a round or oval shape. (See Fig. 218.) The color of the crusts is usually yel-

FIG. 218



The superficial serpiginous syphilide. The area of skin enclosed (over elbows) within the rings of crusts is pigmented, but not at all cicatricial in character.

lowish-brown or greenish-black, and their thickness about one-third of an inch. The underlying surface is smooth, of a grayish-red color, and ulcerated at the margins. Around the edges is a narrow red areola. The ulcerative process slowly progresses at the margins of the patch, a rim of crust at the same time forming. Healing of the enclosed surface keeps pace with the peripheral extension of the ulceration, so that the width of the crust, varying from half an inch to an inch, is steadily maintained. The centre of this surface is blanched; its margins are always red, and they merge gradually into the ulceration. This process may continue many years and involve extensive surfaces. When healing begins the crusts become harder and darker, and the redness of the central patch and of the areola diminishes. Then segments of crusts, having been lifted by the granulations beneath, fall off and expose an ulcerated

ring. Unless cauterized with a solution of nitrate of silver, as it should be, it may persist for a long time. At first the ulcer generally increases throughout its whole periphery; subsequently it may increase only in one direction, thus becoming oval or reniform. The extension of the ulcer is largely influenced by the tissues on which it is seated. Thus an ulcer on the inner surface of the forearm creeps up the arm much more rapidly than toward its outer surface, where the tissues are firmer, and thus a long, oval ulcer is formed. A similar occurrence is observed on the thighs, while on the face, where the tissues are more uniform, the ulcers are generally round. The result of this superficial ulceration may be simply coppery pigmentation, which lasts several months, or very slight atrophy of the skin. The ulceration may even be extensive and chronic in course, and yet induce wonderfully little structural change.

FIG. 219.



The deep serpiginous syphilide, showing much cicatrization of the abdominal wall.

The *deep serpiginous syphilide* has for its focus of ulceration one of the late or tertiary lesions, such as a tubercle, an ecthymaform pustule, an ulcerating gumma, or some traumatism. Whatever the starting-point, there is soon developed a deep, sharply-cut, active ulcer with undermined edges and a coextensive crust. This ulcer increases in size, more or less rapidly, until it attains a diameter of two or three inches, when changes similar to those observed in the superficial variety may occur. The crust becomes thin at its centre and thick at its margin; the thin portion soon falls off, leaving a round, deep-red cicatrix, surrounded by a thick, greenish-black crust less than an inch in width and quite

thick. When this syphilide is fully developed and has attained a diameter of from four to six inches, its changes are more marked. (See Fig. 218.) In the centre is a round or oval patch of cicatricial tissue having a coppery-red color, and as yet firmly attached to the subcutaneous connective tissue. This is completely enclosed by a ring of crust. The ulcerative process is not equally active at all parts of the ring; hence result certain modifications in the shape of the crust. The ulcerating ring which encircles the central cicatrix forms a furrow half an inch to one inch in width and at its most active portions a line or more in depth; it has a foul, grayish-red floor, and sharply-cut, somewhat everted, and undermined edges, which have a deep-red color and are continuous with an areola of similar tint. Portions of this ulcerating furrow may be partially filled by granulations or even entirely cicatrized. Over the more active segments there is a yellowish-brown crust, slightly depressed below the level of the skin, and which may be raised as a film from the surface. In portions further advanced toward healing the crust is thicker, harder, slightly above the surrounding level, and of a greenish-brown color; continuous with it, on parts where the process is quiescent or where healing is nearly complete, the crust is greenish-black in color, is hard and adherent, and its base on a level with the skin. Thus we can always estimate the age of the ulceration from the size, color, consistence, thickness, and prominence of the crusts.

Relapses may occur by ulceration of the cicatrix, sometimes destroying the whole of it. This occurs most frequently in debilitated and poorly-nourished persons and in those who use alcohol to excess. The cicatrix following such a relapsing ulcer is very rough and unsightly. Sometimes the cure is retarded by repeated relapses at the margins of large ulcers, segments which had healed being again attacked by the ulcerating process, or, again, parts more remote may be attacked.

The **course** of this syphilide is always slow, often occupying many years. In some cases it is accompanied by profound cachexia, while in others there is no disturbance of the general health.

This syphilide is of rather rare occurrence. It may appear as early as the third year, but generally later, even up to the fifteenth year, after infection. It appears usually on the inner surface of the forearms and arms, on the breast, and on the legs. It causes little if any pain, but frequently gives great annoyance when near the joints. When the resulting cicatrices are small they are generally thin and parchment-like; but if large they are thick, uneven, and often traversed by fibrous bands, and covered by tubercles of false keloid. Often, however, even the large scars are thin—a fact of importance in making a diagnosis between the syphilide and serpiginous lupus. Blanching of the cicatrix extends from the centre toward the periphery. In large scars there may be a white central patch surrounded by a dull coppery-red areola, even long before healing is completed. In all cases the pigmentation fades slowly, and remains longest in the areola. Contraction of the scar near joints often results in permanent deformity.

The **prognosis** of this syphilide is never very good. Still, a fatal result is by no means inevitable, and proper treatment is in many cases quite effective.

The **diagnosis** from serpiginous lupus and serpiginous chancroid is



seldom difficult. Lupus usually begins in early life, and attacks the face. Its ulcerations are less definite and sharply cut than those of the syphilide. In lupus red tubercles of ulceration, covered by crusts of light-yellow or bluish-brown are mingled with the cicatrices, which are always uneven and fibrous. The history of the case may add to the certainty of diagnosis.

A serpiginous chancroid usually has such a clear history that no mistake can occur. Its locality, its extensively undermined edges, its fungoid surface, and its erratic course are also sufficiently diagnostic.

In opposition to the view of some that this eruption is not syphilitic, it is only necessary to say that it always begins in a syphilitic lesion, that its ulcers and crusts have features similar to those of other syphilitic lesions, and, finally, that its cicatrices are typical of syphilis.

### **Rupia, or the Rupial Syphilide.**

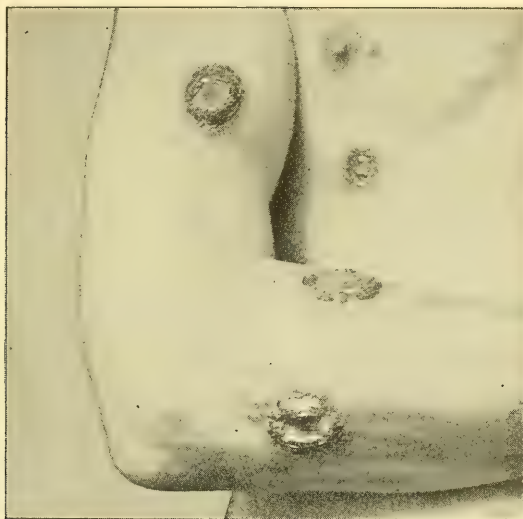
This name, derived from the Greek *ρύπος*, dirt, is applied to an eruption composed of ulcers surmounted by laminated crusts. It appears sometimes precociously during the first year of syphilis, but it really belongs among the late lesions. It usually shows intense syphilitic infection, and is often accompanied by fever. It has never been seen in hereditary syphilis. Although a pustulo-crustaceous eruption, it partakes of the nature of tertiary lesions in the deep-seated infiltration always present beneath the crusts.

Rupia may be divided into two varieties: one, in which the crusts are small, numerous, and quite generally scattered; another, in which they are large, less numerous, and more localized. All of the lesions of rupia begin as a red spot, which soon becomes a flat pustule which dries into a greenish-brown crust. Subsequent changes are very slow and of great interest. The initial crust is usually small, and underneath it is a superficially ulcerated, infiltrated surface. The infiltration and ulceration extend somewhat beyond the original crust, and another layer of crust is formed beneath it by the secretion from the ulcerated surface. Thus several distinct but adherent laminations are formed as the ulcer increases in size, each succeeding one being larger than its predecessor. This result is mainly due to the fact that the pus is quite thick, and that it is secreted slowly and dries very quickly. The process may continue until the crusts reach a diameter of half an inch or even two inches. (See Fig. 219.) In rare cases they have been seen with a diameter of fully six inches. When completed the rupial crust is conical, distinctly laminated, of a brownish-black color tinged with green, similar to a dirty oyster-shell. The crust itself is hard, firm, and adherent, although its layers are often perfectly distinct. Underneath it we find an unhealthy, grayish-red, ulcerated surface bathed in thick, ichorous pus and surrounded by a slightly undermined margin. The depth of this ulcer is rarely so great as that of the severe ecthymaform syphilide. It generally involves about one-half the thickness of the derma. Around each ulcer is an areola of a coppery-red color, which merges into healthy tissue. The growth of these encrusted ulcers is quite slow and often intermittent.

The small rupial eruption begins either about the face or on the inner

and outer surfaces of the forearms. It may then invade the trunk and lower extremities. The crusts vary in diameter from half an inch to an inch. Lamination is first visible when their diameter is about one-quarter of an inch. Their number varies; sometimes upon the face only a small portion of healthy skin is left intact. Upon the face and forearms their height is often greater than their breadth. They are more common on the forehead and near the nose and mouth than on other parts of the face. In some cases only one region is invaded, as the face or the forearms, but the eruption is rarely seen on the lower extremities alone. It generally appears in crops of a limited number, which may follow each other at short intervals and extend over periods

FIG. 220.



Rupia, or rupial syphilide.

of several months or a year. Proper medication, however, will certainly abort such an eruption more or less promptly. In some cases of an eruption composed of many small pustules, even when no treatment has been followed, the crusts have been known to reach a diameter of nearly or quite one inch, and then to dry and fall off, the subjacent ulcer healing meanwhile. In other cases the crusts may run into each other and assume a horseshoe shape. This eruption may occur during the first year of syphilis, but is generally observed later.

The eruption, composed of large crustaceous ulcers, usually presents a limited number of lesions. Exceptionally we find only one crust, but in some cases as many as twenty or thirty. The diameter of a crust in a case that has been long neglected may be even more than two inches. This eruption is most common on the face and trunk, but may occur on the extremities and may be unsymmetrical. The lesions appear singly, or two or three may be developed at the same time; they grow slowly and painlessly. After having reached a diameter of an inch their growth is much slower, many months being occupied in the growth of a crust four inches in diameter. The ulcers underlying the crusts of the

large variety of rupia are rather deep, but rarely involve the whole thickness of the derma. They resemble those of the small variety. After removal of one of the conical crusts a thinner one of a similar color is formed, unless the surface is thoroughly stimulated. Profuse granulations may spring up which hinder cicatrization. Under proper treatment the ulcer slowly heals, until a deep-red glazed spot is left, which gradually becomes thinner and lighter-colored, and, finally, a white, shining surface is left, which is depressed below the general level, and around which a rim of brown pigment remains for months, corresponding with the former areola. These cicatrices are usually not traversed by fibrous bands, but scattered over them are minute holes which indicate the openings of sebaceous follicles.

The **prognosis** of rupia is not good as to the lesion itself nor as to the general condition of the patient. In some rare cases of precocious evolution this eruption becomes general, the lesions being large and numerous, and the general condition being at the same time much depressed. Without careful and vigorous treatment this malignant form of syphilis may be fatal. The small and general form of rupia, although accompanied by cachexia, may be cured in a few months. The ulcers usually occasion much annoyance and suffering.

The large form of rupia is of considerable gravity and calls for energetic local and constitutional treatment. Although many cases recover, death sometimes occurs.

A question of **diagnosis** cannot arise, since no simple eruption resembles rupia.

### The Bullous Syphilide.

Much confusion has been introduced into syphilography by the latitude given to the term "pustule." From the fact that some forms of syphilitic pustules are not situated upon an elevated base and are large and globular, with a tendency to run together, the existence of a true pemphigoid syphilide has been asserted. Further study has proved these lesions to be pustular, and not bullous, yet in some cases true bullæ are developed on syphilitic patients.

The eruption begins like ordinary pemphigus by an effusion of serum beneath the epidermis, which slowly increases, until at the end of a week or two a bulla the size of a pea is formed. The serum soon becomes turbid and milky, and is finally converted into a thick yellow pus. The bullæ vary in size, some being as large as a walnut. They are surrounded by a dull-red areola, which on the legs may be due to effusion of blood. The pus soon dries into a dark, greenish-black, adherent crust.

Under favorable circumstances the underlying ulcer, which is usually not very deep, becomes cicatrized and the crust falls off, leaving deeply pigmented, more or less atrophic spots. Sometimes, however, no change is produced in the skin. Without treatment, especially in cachectic patients, the ulceration increases in depth and extent, and the lesion may then resemble rupia.

This eruption occurs mostly on the forearms and legs, where it may be aggregated. When it invades the trunk it is more copious about the chest, but is generally discrete. Its invasion is usually very slow. Its course is also very chronic and unattended by any marked symptoms,



except soreness and sometimes heat in the bullæ and ulcers. Fresh bullæ may form during the course of the eruption or after it has once disappeared.

The bullous syphilide is almost always a late eruption. Mistakes have arisen from considering certain exceptionally large pustules, or those which have been formed by the fusion of several of the variolaform pustules, as bullæ and calling them syphilitic pemphigus. These bullæ are found even at a late period only in those who have had repeated relapses of syphilis in a severe form and in those having visceral lesions. The opinion has been expressed that an eruption of this kind is a mere coincidence, a pemphigus occurring in a syphilitic subject. In many cases there are certainly no distinguishing marks between the bullous eruption of syphilis and pemphigus, and the diagnosis must then be made from the history and from the associated lesions and symptoms. There are cases in which the syphilitic history is clear, and the bullæ soon form rupial crusts and leave typical tubercular infiltrations.

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## CHAPTER LXXI.

### GANGRENE AND GANGRENOUS ULCERS.

IN some cases of syphilis, as a result of the changes in the coats of arteries and veins, gangrene is produced by which portions of the integument and of the extremities are destroyed.

Until within recent years all ulcerations occurring in syphilitic subjects were regarded as evidences of the breaking down of syphilitic infiltrations. To-day we clearly recognize the fact that spontaneous gangrene of the skin and its resulting ulcers may be due to syphilitic arteritis or to endarteritis obliterans. I have seen a number of well-marked ulcers upon the legs near the ankles and on the dorsum of the foot. Klotz<sup>1</sup> has published several interesting cases of this form of gangrene.

This degenerative condition usually begins in persons of poor nutrition, in those who are debilitated in consequence of bad regimen or excesses in subjects who have not been properly treated and who live in squalor.

The first evidence of syphilitic cutaneous gangrene is a mottling, with perhaps some scaling of the skin. The color then changes to a greenish-brown, and it finally becomes blackish-brown. In some cases this eschar is soft and succulent; in others it is tough, dry, and withered. Very soon separation occurs at the base and the periphery of the lesion, and in a few days or a week or two the slough is removed or falls out, and a deep punched-out ulcer with an uneven, anfractuous, and dirty surface is left. The surrounding skin may be red and œdematous.

In some cases there is local pain; in others a want of sensibility and coldness of the parts are complained of.

<sup>1</sup> *New York Med. Journal*, Oct. 8, 1887.

Trauma, heat, cold, or caustic applications have nothing to do with these lesions.

Under the title "primitive gangrene" Fournier<sup>1</sup> describes a syphilitic manifestation which Bazin called "tuberculo-gangrenous syphilide." He thus describes the morbid process: The lesion, as soon as it has been formed, takes a livid color in the centre and a chocolate color in the peripheral portions, with insensibility of the diseased part; for in reality the formation of an eschar takes place, under which the mortified, insensible, sloughy tissues are found, no external occasional cause being recognizable. The mortified parts take on the appearance of gangrene, they become detached, and underneath the syphilitic ulcer is found at last. The symptoms perfectly bear the character of spontaneous primary gangrene.

Gangrene of the extremities, both upper and lower, is not very uncommon. I have had several such cases under my care. Prof. Podres<sup>2</sup> of Crakow has reported the case of a man, forty-five years old, who six years after infection began to have pain in his legs, which became very anæmic, sensitive to cold, œdematous, and finally gangrenous. This condition necessitated amputation first of the toes, then of the foot, and finally of the thigh. Microscopic examination showed inflammation of the external tunic of the arteries, degeneration of their endothelium, with thickening of their walls and obliteration of their calibre. There was also atrophy of the cutaneous glands and nerves. All of these changes were attributed by Podres to syphilis.

Lang<sup>3</sup> refers to cases in which, as a result of arteritis, gangrene of entire extremities or portions thereof was observed. In some cases the hardening of the affected vessels can be felt by palpation.

Cabot and Warren also report a case in which gangrene of the two lower thirds of the right leg and a gangrenous spot four inches in diameter on the inner surface of the right thigh were observed.

Further, Aune<sup>4</sup> reports a very interesting case among the seven which form the basis of his thesis. It was that of a man thirty-five years old who in late syphilis suffered from gangrene of the hand, forearm, and lower part of arm. In the unobstructed part of the member endarteritis obliterans with periarteritis was found.

Mendel<sup>5</sup> reports the case of a man fifty-five years old in Fournier's service who lost part of his tongue by gangrene which it was thought was caused by old syphilis.

An interesting case, reported by Schuster,<sup>6</sup> in which gangrene of the foot occurred, is worthy of consideration.

Several cases have been published in which symmetrical gangrene of the fingers (the so-called "Raynaud's disease") has been observed in syphilitic subjects, all of which are worthy of close study.<sup>7</sup>

<sup>1</sup> *Gazette des Hôpitaux*, Nos. 37 and 40, 1887.    <sup>2</sup> *Centralblatt für Chirurgie*, No. 33, 1876.

<sup>3</sup> *Vorlesungen über Pathologie und Therapie der Syphilis*, Wiesbaden, 1895, pp. 390 et seq.

<sup>4</sup> "Essai sur les Gangrènes des Membres consecutives à l'Arterite syphilitique," *Thèse de Lyon*, 1890.

<sup>5</sup> *Annales de Derm. et de Syph.*, 1894, pp. 1365 et seq.

<sup>6</sup> *Archiv für Derm. und Syphilis*, 1889, p. 779.

<sup>7</sup> Hutchinson: "A Case of Syphilis in which the fingers of one hand became cold and livid—suspected arteritis," *Med. Times and Gazette*, vol. i., 1884, p. 374; D'Ornellas: "Gangrene spontanée des Doigts par Arterite syph.," *Annales de Derm. et de Syph.*, 1888, pp. 35 et seq.; Morgan: "Raynaud's Symmetrical Gangrene in a Patient suffering from constitutional syphilis," *Lancet*, July 6 and 27, 1889; and Elsberg: "Die Sogenannte Raynaud'sche Krankheit. Syphilit. Ursprungs," *Arch. für Derm. und Syphilis*, 1892, pp. 577.

In summing up the subject Lang very pertinently says: "Naturally, the symptoms which follow an affection of the blood-vessels will vary a good deal according to the nature and extent of the pathological process, to the size of the affected vessel, and in smaller ones according to the dignity of the organ the vascular supply of which is the seat of the affection. Either dilatation or narrowing and obliteration may result; therefore we must expect in due time either an aneurysm or such phenomena as usually follow obliteration of blood-vessels. The constringing and obliterating arteritis will be the less pronounced the smaller the area supplied by the affected vessel, the less important its physiological function, and the more favorable the circumstances for the establishment of a collateral circulation, which in the slow development of the arteritis may be effected with hardly any disturbance. But if terminal or a larger number of blood-vessels are the seat of the affection, an insufficient or entirely interrupted circulation, and consequent diminished nutrition and necrobiosis, are inevitably produced."

### Phlebitis.

The veins are attacked by syphilis much in the same way that the arteries are, in both the secondary and tertiary stages. Mendel<sup>1</sup> published an essay on this subject, based on the study of two cases operated on by V. Langenbeck.

One or many veins may be attacked simultaneously or in succession. According to Mendel, the lesion is a gummatous deposit around the vessel.

Lang<sup>2</sup> states that he found phlebitis and periphlebitis of the right saphenous vein in a twenty-six-year-old man five months after the appearance of the chancre.

Breda<sup>3</sup> reports two cases: in one the left aural, the cephalic, the basilic, and the left median veins were attacked; in the second the veins of the left leg were involved, and the morbid condition was quickly cured by antisyphilitic treatment.

Charvot<sup>4</sup> also reports two cases of phlebitis of the saphenous vein which were cured by mercurial treatment.

## CHAPTER LXXII.

### AFFECTIONS OF THE TONGUE, THE SOFT PALATE, THE PHARYNX, THE LARYNX, AND THE ŒSOPHAGUS.

#### The Tongue.

IN late secondary and in tertiary syphilis the tongue may be the seat of sclerosis and of gummata.

**SCLEROSIS.**—Sclerosis of the tongue is most frequent about the fifth year of syphilis. It is usually developed near the median line, and always on the upper surface of the tongue, and may be *superficial* or *deep*.

<sup>1</sup> "Contribution à l'Étude de la Phlébite syphilitique," *Arch. gén. de Méd.*, March, 1894.

<sup>2</sup> *Op. cit.*, p. 398.

<sup>3</sup> *Revista Veneta di Science Med.*, vol. ii., 1889.

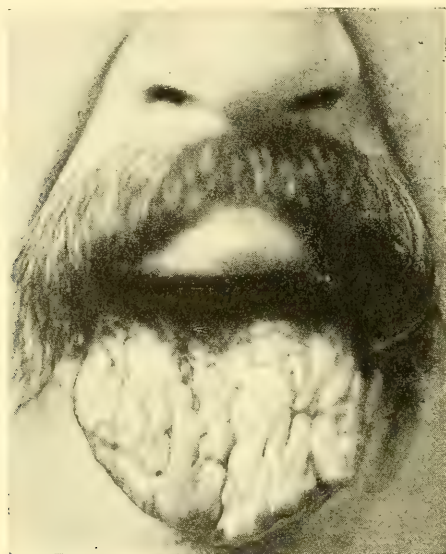
<sup>4</sup> *Archiv. méd. Belg.*, 1891, p. 122; quoted from *Archiv für Derm. und Syph.*, 1892, p. 172.



*Superficial* sclerosis involves the mucous membrane only, and produces a lamellated induration analogous to the "parchment" induration of the chancre. It may be circumscribed or diffuse, and ulcerates only as a result of injury by the teeth, tobacco, or similar irritants.

*Parenchymatous* or *deep* sclerosis may be considered an aggravated form of the superficial lesion, and invades the muscular as well as the mucous tissue. The tongue may be greatly increased in size, but after long persistence of the lesion the newly-formed fibrous tissue retracts, and, as in cirrhosis of other organs, atrophy results. At first the hypertrophied tongue receives the imprint of the teeth at its margin, the body of the organ being lobulated in a manner almost pathognomonic. The lobules are separated by furrows which cannot be effaced by stretching, in this

FIG. 221.



Parenchymatous sclerosis of the tongue.

respect offering a contrast with the rugæ which occur on the tongue in dyspepsia and other depraved conditions of the system. The induration is deep and cartilaginous, and the mucous membrane becomes changed in color and perfectly smooth. Ulceration may result from causes similar to those which produce it in the milder form of sclerosis. When parenchymatous sclerosis involves the whole tongue—which, fortunately, it seldom does—the tumefaction may be enormous.

**GUMMATA.**—Like scleroses, gummata, which are later lesions, may be designated as *superficial* or *parenchymatous*, since they may be found in the mucous or the muscular tissue of the tongue. The *superficial* or *mucous* gumma begins as a small nodule, which soon softens and ulcerates, leaving an excavation with perpendicular margins and an infiltrated base, which is often covered by tenacious false membrane of a yellowish-white color.

*Parenchymatous* gummata are developed in the muscular tissue of the

tongue, taking their origin in the connective tissue. They begin as small tumors, which are sometimes difficult of detection on account of their depth and of the surrounding induration. The process of degeneration extends from the middle of the tumors until the thinned mucous membrane over them on the upper surface of the tongue becomes ruptured, exposing a deep cavity with overhanging and sloughy walls, surrounded by an areola of induration. In view of the great size of the cavity, one would expect excessive deformity, but cicatrization often takes place with relatively slight permanent damage. In rare cases two or more gummatous tumors coalesce, and lead to enormous enlargement of the tongue and proportionate destruction of its tissue. The ulcers may be attacked by phagedena, when the condition becomes still more aggravated. Without treatment these ulcers are remarkably chronic. One has been reported which persisted, with comparatively little change, for twenty years. Gummatous tumors occasionally undergo calcific degeneration.

Their insidious formation, their seat at the sides and toward the tip of the tongue, their chronic course, and their freedom generally from spontaneous pain are characteristic features of gummatous tumors. The observation of Anger, that lancinating pain shooting toward the ear is diagnostic of cancer of the tongue, has been repeatedly confirmed. Gummatous tumors may appear at a period much earlier than is usual with cancerous. A gumma begins as a nodule which breaks down; epithelioma as a firm, a warty, or an exuberant growth. In addition to these facts, and to the individual and family antecedents of a patient, the ulcerating surfaces of the tumors present somewhat constant features, which may assist in the diagnosis.

Gummatous ulcers are usually multiple, bilateral, and are always upon the upper surface of the tongue; cancerous ulcers are usually single, and may occupy its under surface. The ulcerative process of gummata destroys the tumor; carcinomata present an ulcerating tumor, the induration of which extends with the eroding process. The floor of a gummatous ulcer is sometimes sloughy and is slightly vascular; that of a cancerous ulcer bleeds readily, and, at an advanced stage, secretes an ichorous pus. Zeissl gives diagnostic importance to the fact that "sebum-like plugs" may be pressed from the mucous membrane in epithelioma of the tongue.

Interference with the functions of the tongue is much less in gummata than in cancer. Ganglionic enlargement is rare in syphilitic lesions of the tongue, with the exception of the chancre, while in cancer it always occurs.

Confirmatory evidence may be furnished by microscopic examination of the tumor and by the effect of antisyphilitic treatment, which, in cancer, is sometimes evidently harmful.

The **diagnosis** between syphilis and tuberculosis of the tongue is sometimes difficult, especially in those cases where the two diseases coexist, and in rare instances where tubercular deposit takes place in the tongue prior to the development of pulmonary symptoms.

In all cases of hypoplastic growth on or in the tongue the suspicion of syphilis should be entertained, and a tentative active treatment should be instituted.

### Atrophy and Hemiatrophy of the Tongue.

**ATROPHY OF THE TONGUE.**—Lewin and Heller<sup>1</sup> have recently called attention to a superficial and localized atrophy of the tongue, particularly at its base. In this form the follicular glands are involved by circumferential round-cell infiltration. This neoplasm is unstable in structure, and soon degenerates and is absorbed. This condition, with the possible obliteration of the vessels of the immediate part, is the cause of the atrophy, which has a smooth, somewhat depressed, and compact surface. By this process several or all of the follicular glands become atrophied, more or less of the adenoid tissue, particularly of the lingual tonsil, becomes absorbed, and the epithelial layer is diminished in thickness. Lewin and Heller state that this form of atrophy is quite frequently observed.

**HEMIATROPHY OF THE TONGUE.**—Leudet<sup>2</sup> reports the case of a woman thirty-two years old who had headache on the right side for eighteen months, and who for five months experienced difficulty in mastication, and had a decidedly nasal voice. The right side of the tongue was atrophied; its tactile sensibility was preserved, but its gustatory sensibility was impaired. There was also an ulcer of the palatine vault, paralysis of the vocal cord, and rhinitis. All the symptoms, except the hemiatrophy and the paralysis, were cured by specific treatment.

Mauriac at the International Medical Congress in 1889 mentioned the case of a man forty-four years old, syphilitic fourteen years, who suffered from various nervous phenomena and had right-sided hemiatrophy of the tongue.

### Gummatous Infiltration into the Soft Palate.

There are very few syphilitic lesions which develop so insidiously and produce such almost irreparable injury as gummatous infiltration of the soft palate.

Early **symptoms** are insignificant or entirely wanting. Possibly the patient notices a slight uneasy or tickling sensation in the fauces, and experiences some difficulty in deglutition, which he naturally attributes to an ordinary cold; he may even find when attempting to swallow liquids that they regurgitate through the nostrils, but this he regards as accidental. Suddenly, however, and without further warning, he is nearly deprived of the power of speech and deglutition. His voice is transformed to an almost unintelligible nasal whisper, and upon attempting to eat, solids, and especially liquids, are returned through the nose.

If we are so fortunate as to observe this affection in its earliest stage, we find that it has two modes of commencing:

1st. A deposit of gummy material may take place in a circumscribed mass within the substance of the soft palate and between its buccal and nasal surfaces. This mode of origin is the one usually described by authors. The deposit then appears as a flattened tumor, of the size of a bean or almond, encroaching upon the cavity of the mouth. It is at

<sup>1</sup> "Die glatte Atrophie der Zungenwurzel und ihr Verhältniss zur Syphilis," *Arch. für Path. Anat., etc.*, 1894, vol. cxxxviii, pp. 1 et seq.

<sup>2</sup> "Hemiatrophie de la Langue d'Origine syphilitique," *Annales des Mal. de l'Oreille et du Larynx*, Dec., 1887.



first hard to the touch, but subsequently, when secondary degeneration has taken place, soft and fluctuating.

2d. In other cases the infiltration is diffuse. No tumor exists, but the velum is generally thickened, its mucous membrane reddened, and its mobility impaired, as is evident when the patient attempts to articulate or to swallow.

Rupture of the abscess or ulceration of the infiltrated tissues may involve both mucous surfaces or only one; in the latter case it is usually the buccal: a cavity with sharply-cut and ulcerated edges is then visible in the soft palate, while possibly the voice and the power of swallowing remain unimpaired. The destructive process, however, may proceed with great rapidity, and complete perforation may soon follow. The perforation may be limited in extent, but frequently a large portion or the whole of the velum is destroyed, together with the uvula and the pillars of the fauces, and thus an immense door of communication is opened between the mouth and nose. It is thus easy to account for the indistinct and nasal voice—or “duck’s voice,” as the French call it—of such patients, and also for the reflux of liquids and even solids, and yet the absence of pain which characterized the onset of the disease is still a remarkable feature, since deglutition, although so difficult, is attended with a merely trifling sensation of discomfort. In addition, there is often some dulness of hearing, due, doubtless, to the œdema of the tissues composing the walls of the pharynx and surrounding the orifices of the Eustachian tubes.

In time the subsidence of the infiltration is followed by amelioration of these symptoms. What remains of the velum recovers in a measure its pliability and renews its function. Practice also assists in teaching the patient how to avoid regurgitation of solids and even fluids. Some improvement also takes place in the voice, and this may be greatly increased by wearing a proper plate made of hard rubber or gold. The impairment of hearing is only temporary.

It remains to speak of a remarkable sequel of this affection—viz. the change which usually takes place in the fauces as a consequence of the process of repair. Directly after the mischief has occurred the remains of the soft palate are dependent, and the opening communicating between the mouth and nares is very large. One would naturally suppose that this condition would continue, or would even be aggravated at a subsequent period after cicatrization had taken place. Strange to say, such is not the course of events. The dependent remains of the palate become elevated, the ulcerated edges contract adhesion with the ulcerated walls of the pharynx, and the opening, which at first was simply immense, gradually contracts, until finally complete atresia is the result, or, more frequently, a diminutive channel of communication remains between the buccal and nasal cavities, less in diameter than the normal opening.

Cases not unfrequently occur in which the surgeon may hesitate to express an opinion as to the cause of ulceration and perforation of the soft palate. Two causes only are likely to produce this result: syphilis and tuberculosis, and the former by far more frequently than the latter.

If the patient be an adult who has enjoyed at least tolerable health until the present attack, there can be little doubt but that the cause is

sypphilis. No matter if a syphilitic history is obscure or even denied. Admitting the honesty of the patient, the primary and secondary symptoms may have been overlooked or forgotten and have left no traces.

Tertiary lesions often appear years after the secondary stage, and when least expected. Then, too, they are isolated, without concomitant symptoms to assist the diagnosis.

The **diagnosis** rests between syphilis and tuberculosis, with the chances in favor of the former. The history of the patient should be carefully inquired into, and the eyes, the nose, and the teeth should be carefully examined to determine whether they were ever affected by syphilis.

In all cases the effect of treatment is a valuable aid to diagnosis. Syphilitic ulceration usually yields to full doses of the iodide of potassium and mercury. Tuberculous ulceration may be benefited by the same remedy, especially if combined with tonics, but it exhibits no such marked improvement within a few days.

### The Pharynx.

Lesions similar to those occurring in the mouth are met with in the pharynx. Erythema, superficial ulcers, and deep ulcerations resulting from degeneration of gummatous deposit may be observed. The occurrence of mucous patches of the pharynx has been noted by several authorities, but they are not common. Frequently ulcers extend into the pharynx from the posterior nares.

The **symptoms** of pharyngeal syphilis are usually insignificant, except in the case of ulcers, when there may be pain, aggravated in the act of swallowing and especially on the ingestion of acrid or irritating substances. The posterior portion of the lateral walls of the pharynx is more often attacked than the posterior wall. Gummy tumors have been observed on the vault of the pharynx and on the upper part of its posterior wall. After destroying the mucous membrane the disease may even invade the vertebræ and produce necrosis, or even inflammation of the contents of the vertebral canal.

Syphilitic ulcerations of the pharynx are of special interest on account of the traces which they leave in the form of cicatrices or of adhesions, which diminish the capacity of the cavity and interfere with its functions. The cicatrices seen upon the pharyngeal wall are quite characteristic. They may present a stellate appearance or may assume the form of prominent bands. The cicatricial tissue is white and glistening, and may persist indefinitely or gradually contract.

In rare cases the entire soft palate is destroyed by ulceration; necrosis of the hard palate occurs, and the mouth, the nose, and the pharynx are converted into one enormous cavity. In milder cases, when the ulcerative process is limited to the border of the velum and pharyngeal wall, adhesions may form, which divide the cavity of the pharynx into two distinct chambers, one communicating with the posterior nares and the other with the mouth. There may be a very narrow passage between these two cavities, or they may be completely shut off from each other, respiration being carried on exclusively through the mouth.

It is often very difficult to distinguish between the deep ulcerations of syphilis and those of tuberculosis. There are at least four points to

be considered in making a diagnosis. In syphilis other lesions are usually found. Syphilitic ulcerations follow the formation of a gummatous tumor; in but few cases, however, on account of the very slight inconvenience occasioned by even extensive lesions, is the patient observed before complete destruction of the original gummy tumor. Specific ulcers usually progress more rapidly than tubercular ulcers, and finally they yield to specific treatment. Some observers claim that the ulcers themselves present distinctive characteristics, but this can be very rarely the case.

The **diagnosis** must be based chiefly on the antecedents of the patient and the history of the lesion.

### Affections of the Larynx.

In tertiary syphilis the larynx may be attacked by chronic inflammation, by deep ulcerations, and by gummy tumors. As secondary results of these processes perichondritis and caries and necroses may be developed.

**CHRONIC INFLAMMATION.**—Chronic inflammation of the larynx is an intermediate lesion; it may follow an early catarrh or may not appear until three or four years after infection. The color of the mucous membrane is decidedly darker than in the early erythemas, although Whistler affirms that it never deserves the name “coppery,” which has been applied to it by some authors. The affection is very persistent, and commonly leads to thickening or *hypertrophy* of the mucous membrane, which, according to Krishaber, is the only one of the early lesions which does not disappear spontaneously. This thickening is quite different from the œdema occurring with an erythema, in which the mucous membrane has a puffy appearance. The thickening of the cords may be so great as to require operative interference for the relief of the dyspnœa. A remarkable instance of this condition has been reported, in which tracheotomy was done four times during a period of five years. Associated with this condition chronic ulcers are almost always found. These ulcers have ragged and thickened edges; frequently vegetations spring from them which may reach a considerable size, even to the degree of producing aphonia and of impeding respiration. The vocal cords, which are thickened and rough, are very often the seat of these ulcers. The ventricular bands may be so swollen as to overlap the cords. The vegetations which may grow from the margins of an ulcer or from other portions of the mucous membrane are often difficult to distinguish from simple polypoid growths. Their favorite seat is at the insertion of the inferior vocal cords. Ferras states that they may appear in the ventricles of the larynx, where natural papillæ are scanty. The history of the case, or even the empirical use of specific treatment, may sometimes be required to determine their character.

**DEEP ULCERATIONS.**—Deep ulcerations occurring in the later stages of syphilis may form by extension from the pharynx or by degeneration of gummatous deposit. The epiglottis may be entirely destroyed by the ulcerative process. Next in order of frequency the aryteno-epiglottic ligaments are attacked, then the superior vocal cords, and more rarely the true cords. The ulcerations, especially those of gummy



tumors, are very irregular and indurated. Frequently, vegetations like those occurring in connection with the ulcers described in the preceding section accompany these deep ulcerations. Extensive regions may be destroyed in a chronic and insidious manner, irreparable injury being done. These ulcerations can hardly be confounded with those of tubercular origin, which are smaller, more numerous, and more superficial. The lardaceous base and the general appearance of the lesions, in connection with cicatrices of previous ulceration, suggests their specific character. They are much more likely to be mistaken for malignant disease. In cancer the tonsils and the submaxillary glands are at an early period the seat of infiltration. Pain, often extreme, is distinctive of cancer, while the syphilitic lesion makes much slower progress, and is generally painless until the tissues have been extensively destroyed. In most cases of syphilis, moreover, there is a clear history of infection, and traces of former lesions may be discovered in the mouth or pharynx or in other regions of the body.

**GUMMY TUMORS.**—Gummy tumors of the larynx are much more common than has been supposed. Two forms of gummatous deposit are described by Simyan: a circumscribed variety of a grayish-red color, and a diffuse infiltration which has a yellowish color. Virchow describes gummy tumors of the larynx as extremely vascular nodules, of softer consistence than those developed in other regions, which gradually ulcerate and penetrate the deeper tissues. The lesion is often single, and may attain a very large size; frequently the tumors are small and multiple, and may be limited to the mucous and submucous tissues. The deposit sometimes undergoes absorption, but more frequently it degenerates, forming the deep, ragged ulcers already described, which may involve the framework of the larynx and produce permanent deformity. The epiglottis and the arytenoids are most often involved, but any of the laryngeal cartilages may suffer. A fatal termination may ensue in the course of these lesions from impediment to respiration, due to the size of the tumor or to an acute œdema of the larynx. A single case of death from hemorrhage has been recorded by Türk.

**PERICHONDRITIS.**—Perichondritis is generally the result of the extension of an inflammatory or ulcerative process from the mucous and submucous tissues. The cartilage itself may be involved. Pain of a marked character is a common symptom of this lesion, and the parts are sensitive to external pressure. Crepitation on palpation of the cartilage is referred to by Jullien and others as a sign of its invasion. Œdema of the soft parts, and deformity from the structural changes in the affected cartilage, are frequently observed. The epiglottis and the arytenoid cartilages are most often involved, more rarely the cricoid. They may be entirely destroyed.

**CARIES.**—Caries, or true *necrosis*, in cases where ossification of the cartilage has taken place is a common sequel of the invasion of the perichondrium by inflammation or gummatous ulceration. It is always a very late accident, and frequently induces structural changes in the larynx which cannot be remedied.

### The Œsophagus.

The Œsophagus is very rarely attacked in the tertiary stage of syphilis, and no cases are on record in which it was the seat of morbid change in the secondary stage. Hermann<sup>1</sup> could only find twelve recorded and trustworthy cases in medical literature of tertiary disease of the tube. The case of Mr. West<sup>2</sup> is one of the most satisfactory thus far reported. It was that of a girl aged twenty-one who had suffered for several years from well-marked syphilitic manifestations, such as eruptions upon the skin, ash-colored ulcerations of the fauces, rheumatic pains, and syphilitic cachexia, and who was admitted into Queen's Hospital, May 18, 1858, for stricture of the Œsophagus. Treatment by means of tonics, iodide of potassium, and mercurials afforded only temporary relief, and she succumbed on Sept. 2d of the same year. The following appearances were found at the post-mortem examination: "The upper portion of the Œsophagus for about four inches was much dilated; its mucous membrane thickened, and marked by spots having the appearance of recent cicatrices. At this distance from the upper end it was suddenly constricted, and terminated in a narrow canal which would barely admit a No. 4 catheter. This constricted portion, which was about two inches and a half in length, was formed by the thickening of the mucous membrane and by fibrous deposit in the form of bands and bridles, having very much the appearance of an old stricture of the urethra. Below this track the Œsophagus continued perfectly healthy to its termination in the stomach. Both lungs contained tubercular deposit in different degrees of softening, with several small cavities in the upper lobe of each, one in the left apex being as large as a pigeon's egg."

Birch-Hirschfeld<sup>3</sup> speaks of a gummatous ulcer which extended down the Œsophagus to the stomach.

This affection begins in submucous gummatous infiltrations, runs a chronic course, and leads either to ulceration or absorption, stricture inevitably resulting in either case. If the case is seen early, active antisymphilitic treatment may bring about resolution. When cicatricial stenosis has developed, internal treatment will be of no use, and gradual dilatation, if possible, should be tried. In extreme cases gastrostomy may be necessary.

All cases of stricture of the Œsophagus arise from caustics, from syphilis, and from cancer. Traumatism being excluded, the diagnosis rests between syphilis and cancer. It is always well to give the patient a thorough tentative antisymphilitic course of treatment. It is well to remember that in cases of syphilis of the Œsophagus epithelioma is liable to attack the specific neoplasm or its sequelæ.

<sup>1</sup> "Sténose de l'Œsophage d'Origine syphilitique," *Thèse de Paris*, 1890.

<sup>2</sup> *Dublin Quarterly Journal of Medical Science*, Feb., 1860.

<sup>3</sup> *Lehrbuch für Path. Anat.*, 3d ed., 1887, vol. ii. p. 518.

## CHAPTER LXXIII.

## AFFECTIONS OF THE TRACHEA, BRONCHI, LUNGS, AND HEART.

THE trachea, bronchi, lungs, and heart may be the seat of morbid changes in tertiary syphilis. The trachea alone may be attacked; in some patients the bronchi are involved; and in rather rare cases the trachea, bronchi, and lungs are affected.

These affections are not common, and we are not to-day in possession of sufficient knowledge to allow us to give a full description of the clinical history.

Undoubtedly some cases of late syphilitic changes in these parts are diagnosticated as of cancerous origin, and in many their syphilitic nature is only ascertained after death.

**Trachea.**

Parrain,<sup>1</sup> who has gone over the subject of gummatous affections of the trachea quite fully, reports two cases in which a diagnosis of syphilis was made during life. The first case was that of a woman forty-nine years old, who early in her trouble suffered from a raucous cough and dyspnoea, but whose voice was not much changed from normal. Gradually the respiration became more difficult, and was attended with a whistling sound and a roaring noise in the trachea, frequent cough, and much muco-purulent expectoration. There were also nocturnal paroxysms of suffocation. Under the use of the mixed treatment improvement began and a complete cure resulted.

Parrain's second case was that of a man aged thirty-nine years, who had much dyspnoea and tracheal roaring sounds and coincident drawing in of the substernal and epigastric walls. At the autopsy mucous and submucous swelling was found, which extended into and nearly obliterated the left bronchus.

Fränkel<sup>2</sup> reports the case of a woman forty-one years old who had a raucous voice and coughed for six months before she died. The trachea was found to be normal down to the fourth ring, and from there to the bifurcation it was studded by a number of small salient nodules, some of which were ulcerated, and interspersed among them were several star-shaped cicatrices. In this case the bronchi were surrounded by a hard, cartilaginous connective tissue. The thyroid gland was also affected.

The case of a sixty-year-old woman in which extensive gummatous ulceration of the trachea, extending into the bronchi, was found, together with chronic interstitial pneumonia, has been reported by Scheck.<sup>3</sup>

The lesions in tertiary syphilis of the trachea are gummatous infiltration and dense connective-tissue proliferation. As a result of these conditions ulceration, cicatrization, and stenosis follow.

<sup>1</sup> "Sur les Gommès syphilitiques de la Trachée," *Thèse de Bordeaux*, 1894.

<sup>2</sup> "Ueber Tracheal und Schilddrüsen Syphilis," *Deut. med. Wochenschrift*, 1887, No. 48, p. 1035.

<sup>3</sup> "Beitrag zur Lehre von der Syphilis der Lunge, Trachea, und Bronchien," *Internat. klin. Rundschau*, 1887, p. 142.



According to Dreschfeld,<sup>1</sup> the most prominent symptoms of tracheal stenosis are—1. Dyspnoea, most marked during inspiration, and especially so on any exertion of the patient. This, though a most prominent symptom, may occasionally be absent, though the obstruction to the entrance of air into the lungs may be very great. 2. A hoarse, weak, or croupy voice, even if the larynx be free from disease, due to the weak air-current. 3. Swelling of the jugulars with every expiration, due to the abnormally increased pressure in the large veins within the thorax during expiration. 4. Slight downward movement of the larynx with every inspiration. This movement is much more considerable in stenosis of the larynx. 5. The patient breathes easier with his chin depressed, as this causes relaxation and dilatation of the trachea. In laryngeal stenosis, on the other hand, the head is thrown back to facilitate the breathing. 6. Retraction of the lower part of the chest with every inspiration. 7. Loud inspiratory stridor, heard best over the sternum, occasionally accompanied by a thrill to be distinctly felt over the place of constriction. Auscultation of the lungs reveals weak breathing and loud rhonchi, unless there be some lung complication. It often happens that the stricture is at the bifurcation of the trachea, and extends to one bronchus rather than to both. In such cases we have the characteristic symptoms of stricture of a bronchus (diminished fremitus, diminished breathing, and more marked inspiratory retraction of the ribs) on that side. 8. The laryngoscopic examination may enable us to see the affected part, especially if the stricture is high up in the trachea or if the ulceration is extensive; and the introduction of a sound through the larynx, recommended first by Demme, may in doubtful cases assist us in our diagnosis. In spite of these definite symptoms, the diagnosis between syphilitic stricture of, and pressure on, the trachea is sometimes a matter of great difficulty.

### Bronchi.

The bronchi are similarly, and often synchronously, affected by the same processes which attack the trachea. There are many more or less satisfactorily reported cases of late syphilitic disease of the bronchi, in all of which stricture is the prominent feature. A recent and very well-observed case is that of Oestreich.<sup>2</sup> It was that of a woman who was supposed to suffer from tuberculosis, although no bacilli were found in the sputum. This woman's voice was normal, and the respiratory movements of the left chest were very weak. She suffered from paroxysms of dyspnoea, and over the left lung dulness in some places and tympanitis in others were heard. At the autopsy the lumen of the left bronchus was found to be nearly obliterated. This stenosis was due to a radiating cicatrix which began at the bifurcation and extended into the bronchus.

### The Lungs.

Our knowledge of the pathological anatomy of syphilitic processes in the lungs is far in advance of that of its symptomatology and clinical history. The truth is, that we have not yet such criteria as will enable us to sharply distinguish in the living subject the differences between

<sup>1</sup> *Medical Chronicle*, Dec., 1885.

<sup>2</sup> *Berl. klin. Wochenschrift*, 1894, No. 44, p. 1008.

pulmonary tuberculosis and syphilitic infiltration into the lungs. Many mild cases of localized lung disease in syphilitics are seen which get well under specific treatment, and from these very important cases we can derive no anatomico-pathological facts which will show us just what has taken place. Then, again, in many cases of syphilitic infection the resulting lung trouble is complicated by essential tubercular lesions, and this symbiosis makes our clinical studies uncertain or of no value.

The **morbid anatomy** of syphilis of the lungs has been carefully studied by Lancereaux,<sup>1</sup> who in a recent essay states that the lesions are rather rare, but the anatomical changes are sufficiently well marked as to be readily recognized. They occur in the form of indurations and gummata. Syphilitic sclerosis differs from tuberculous induration of the lung in many ways. It is met with, as a rule, in the lower or middle lobes rather than at the apices, and in the form of bands and fibrous tracts which are not welded together into a compact mass, but may enclose islets of lung-tissue, generally more or less emphysematous. The fibrous tissue is not pigmented. The bronchi in relation with these indurations are often flattened, and the alveoli are filled with exudative fluid containing leucocytes and desquamated endothelial cells. The pleura is often thickened and adherent about such diseased areas, and the surface of the lung is puckered and furrowed in much the same manner as the surface of a cirrhotic liver. Syphilis and tubercle may be combined in the same organ, but the appearance of the sclerosed tissue is distinct in each. Cavities and the presence of fresh tubercle in other parts will aid the diagnosis. It is probable that many cases of chronic tuberculous disease have been classed in literature as syphilitic. Chronic pneumonia gives a firm, compact, indurated mass, soft and glossy to the feel and not puckered on the surface. Leprosy of the lung is very rarely seen, and the characteristic bacilli would serve to distinguish it. Gumma of the lung is met with rather more frequently than syphilitic induration, but is still very uncommon, and no case should be accepted as such without absolute proof. Lancereaux gives the details of a case, and from the microscopic structure of the gummatous masses he believes that they are formed by peripheral increase from a starting-point of periarteritis. Fatty degeneration takes place in the centre of the mass, but the remains of alveolar walls and flattened epithelium can often be recognized. The parts around may be thickened by proliferation of lymphoid cells and congestion, and about the whole mass, which is indicated under the term "gumma," there is always a zone of indurated tissue more or less firm and vascular. The fatty degeneration of the centres of the masses may lead to liquefaction, and the evacuation of the fluid thus produced causes considerable irritation of bronchi. Cicatrices are often found in the neighborhood of the gummata, and a dry pleurisy is usually set up, which results in dense adhesions. Syphilis never causes a purely serous exudation in the pleura. The diagnosis by physical signs is exceedingly difficult, and the symptoms are apt to be very misleading. Cough, dyspnoea, hæmoptysis, and muco-purulent sputum may all be present, but the absence of the bacilli

<sup>1</sup> "Syphilis des Poumons, etc.," *L'Union médicale*, 1891, No. 13, pp. 145 et seq. The reader is also referred to an excellent essay by Satterthwaite ("Pulmonary Syphilis in the Adult," *Boston Med. and Surg. Journal*, June 11 and 18, 1891).

from the latter will form an important element in the diagnosis. Wasting, as a rule, only occurs when the liver or spleen is attacked by the disease, and it may thus happen that wasting will be progressive while the condition of the lung is improving. The latter tends to become stationary after a while, and if other organs are not affected the prognosis is good. The suspicion of syphilis should always attach to lesions beginning in the lower parts of the lung, and slowly progressing without the production of fever. (See section on Pleurisy, page 588.)

### Affections of the Heart.

In late syphilis the heart may be attacked by a chronic inflammation which produces a sclerosing fibrous tissue, and it may be the seat of gummata. The endocardium, the myocardium, and the pericardium may be attacked.

Endocarditis usually coexists with myocarditis. In an exhaustive study of the reliable published cases T. Lang<sup>1</sup> traces the course of these affections. The walls of the heart are more commonly attacked than the valves. The most frequent location of endocarditis is in the left ventricle, at the apex or at the base of the heart near the opening of the aorta. The vegetative or verrucous form is much less common than the fibrous or sclerotic. Gummy endocarditis is usually combined with the fibrous form of syphilitic myo- and pericarditis. Its clinical symptoms are indefinite and little known. Very often it runs its course without apparent symptoms. The prognosis is unfavorable.

Syphilitic endocarditis is always circumscribed, and rarely occurs prior to the second year after infection. The fibrous form generally attacks the left ventricle, especially at the apex, the anterior wall, and the septum ventriculorum. Its origin is found in the interfibrillar connective tissue. The gummy form is generally associated with the fibrous, and affects all parts of the organ and all the layers of its wall. The tumors may attain the size of a hen's egg or a billiard-ball. As long as the destruction of muscular substance is inconsiderable or compensated by hypertrophy of the intact tissue, and as long as the neuro-muscular apparatus of the heart is unaffected, the myocarditis occasions no considerable functional disturbance.

Syphilitic pericarditis is rarely primary, but usually follows myocarditis, and therefore involves especially the visceral layer. But the entire pericardium may be implicated. The chronic or fibrous form leads to the formation of a compact, coarse-fibred tissue, to contraction, deformation of the contiguous surface of the heart, and constriction of the great vessels.

Gummata of the pericardium rarely occur except as the result of the extension of myocarditis. In one of Mracek's<sup>2</sup> cases, besides a gumma of the left ventricle, the pericardium was injected and infiltrated by gray granulations of the size of the head of a needle and disseminated in little groups. In several cases it has been noted that the process began in the aorta and extended to the heart.

<sup>1</sup> *Die Syphilis des Herzens*, Vienna, 1889.

<sup>2</sup> "Die Syphilis des Herzens, etc," *Archiv für Derm. und Syph.*, Ergänzungsheft, No. 2, 1893, pp. 279 et seq.



The **symptomatology** of syphilis of the heart has been well studied by Buchwald,<sup>1</sup> and shows a wide range. It includes headache, dizziness, flashes of light, loss of strength, palpitation, dyspnœa, feverishness, sore throat. In some cases there were symptoms of angina pectoris, and neuralgic pains like those of aneurysm. In all cases there was irregularity of the heart, more or less hypertrophy, and, what is especially noteworthy, alterations in the peripheral vessels, such as are commonly ascribed only to old age. The arteries were hard and tortuous, more especially the temporal arteries, and, to a less extent, the radials.

The **course** of the disease was also characteristic. The cases in which the heart insufficiency could no longer be influenced favorably quickly became worse, developing marasmus, and kidney disease and sometimes pulmonary infarction, with hæmoptysis.

The majority of cases showed a rapid improvement under antisymphilitic treatment. One case that developed aortic insufficiency while under observation was so much improved that no trace of this lesion was recognizable. Another, whose heart lesion was cured, developed sudden aphasia and cerebral disease, but recovered from this also under large doses of iodide of potash. In other cases the peripheral arteries recovered from their hard and tortuous condition. (See sections on Aneurysm and on Gangrene for further information relative to changes in the vessels.)

## CHAPTER LXXIV.

### AFFECTIONS OF THE LIVER AND SPLEEN.

#### The Liver.

THE liver is more frequently attacked by syphilis than any other abdominal organ. The mild and ephemeral jaundice has already been described. (See page 591.)

The late syphilitic lesions of the liver have been very exhaustively described by Chvostek.<sup>2</sup> According to this observer, syphilis causes in the liver—(1) amyloid degeneration, which results from cachexia; (2) perihepatitis, usually with decided thickening of the capsule, leading to adhesions with surrounding parts; (3) hepatitis, in which there is considerable increase in the connective tissue, followed by shrinking and the formation of cicatrices. Of hepatitis there are two forms—the diffuse and the gummatous.

The **symptoms** are usually so mild that the patient has no suspicion that his liver is attacked until considerable time has elapsed.

The liver may be somewhat enlarged, and is frequently irregular, and

<sup>1</sup> *Op. cit.*

<sup>2</sup> "Ueber Syphilitische Hepatitis, etc.," *Vierteljahr. für Derm. und Syphilis*, vol. xiii., 1881, pp. 325 et seq.

on its surface there may be nodular protuberances of the size of a walnut or egg, between which are deep sulci.

Pain, either localized or diffused, in the hepatic region is the most common symptom. It may be sharp and severe or dull and persistent. It is made worse by pressure upon the organ. This symptom generally ceases in a gradual manner.

In cases of perihepatitis pain is sometimes very severe, and when the process is recent a friction-sound may be heard. In these cases the peritoneum is involved by the extension of the morbid process. As a result of pressure upon the portal vein ascites may occur. The spleen may also become affected, and in some cases there is hemorrhage from the stomach. Albuminuria is a very common complication. Patients thus affected have a sickly, earthy look, with perhaps some bronzing of the skin.

The **diagnosis** of liver-syphilis should be based on the history of the case, on its symptoms, and on concomitant visceral lesions. From cancer it is distinguished by the synchronous albuminuria and splenic enlargement, by the very great irregularity of surface produced by the protuberances, and by its slow stationary condition during a long period of time. In cirrhosis there is usually no history of syphilis, but one of alcoholism is, as a rule, readily obtained.

The **prognosis** of syphilis of the liver is not good, but relief may result from treatment if begun sufficiently early.

Syphilis of the liver occurs more frequently in men than in women, and appears from two to twenty years after the onset of the infection. Peiser,<sup>1</sup> as the result of the study of 34 cases of liver-syphilis (21 men, 13 women), in which the date of infection and of the onset of the visceral disease was clearly made out in 15, found that it began as follows: At 2½ months in 1 case; 2 years in 1; 3 to 4 years in 4; 6 to 7 years in 3; 12 years in 1; 14 years in 1; 18 years in 1; 20 years in 1; 23 years in 1; 25 years in 1. Structural changes in the liver are most commonly found in patients between twenty and fifty years of age.

#### LATE JAUNDICE.

Besides the mild and ephemeral variety already described (see page 591), we sometimes observe in the course of syphilis at late periods a severe form of jaundice. This variety differs in the great severity of the symptoms, in the well-marked and persistent discoloration of the skin, and in the existence of a very profound cachexia. There may or may not be coexisting syphilitic lesions on the body, but such patients are usually afflicted with severe neuralgias and persistent headache. Unless the patient is carefully attended to, this condition goes from bad to worse, and is sometimes followed by a fatal result. It is a condition which indicates grave disease, and should not be underestimated. Its duration is generally chronic, and the affection is not prone to be easily influenced by treatment. This, besides combining specific medication, should be addressed to the visceral trouble. Tonics, nutritious food, with stimulants used with judgment, should be administered.

The **causes** of this affection of the liver are very obscure and have not been cleared up by post-mortem studies. Lancereaux thinks that it is

<sup>1</sup> *Die Lebersyphilis*, brochure, Leipsic, 1886.

due to compression of the biliary ducts by enlarged lymphatic ganglia, while Fournier is of the opinion that it has its origin in gastro-intestinal catarrh. That syphilis has an influence in its causation is now generally admitted, since so many observers have noted its development in infected persons who had not previously been thus affected, and who had not taken mercury nor been addicted to the excessive use of alcoholics.

Precocious hepatitis and perihepatitis are somewhat infrequently observed. Drühe<sup>1</sup> reports the interesting case of a man twenty-one years old who had a chancre and small papular eruption. Fourteen days after the onset of the secondary period the area of liver dulness became much diminished, and the spleen became swollen. The man also suffered from albuminuria and hemorrhages from the nose and intestine. After death, which occurred two months after infection, diffuse hepatitis and perihepatitis were found.

#### ACUTE YELLOW ATROPHY OF THE LIVER.

Engel-Reimers<sup>2</sup> reports three cases of acute yellow atrophy of the liver in adult syphilitics in the early months of the infection. The clinical history and pathological anatomy were in accord with that of the non-specific form of the disease. Every other pathogenic cause, phosphorus-poisoning, etc., was excluded, and the dependence of the disease on syphilis was established to the author's satisfaction. Senator<sup>3</sup> also reports two cases similar to those of Reimers.

#### The Spleen.

The spleen may be the seat of structural change in the late period of syphilis. The early affection has already been described. (See page 590.)

The late syphilitic processes in the spleen consist of an interstitial and a gummatous infiltration.

In interstitial inflammation the process begins around the blood-vessels, and a diffuse connective tissue which presses on the pulp is produced. In this condition the organ may be much diminished in size. The connective-tissue bands are paler than the normal tissue, from which they do not project at all, but merge diffusely into the surrounding spleen-tissue, contain but little blood and few cells, and in the centre consist of a finely granular material in which a few cells and nuclei are imbedded.

#### GUMMATA OF THE SPLEEN.

Gummata vary in size from that of a millet-seed to that of a walnut, and may be few in number or very numerous. Their number is usually greater when their size is small. In some cases the spleen itself is enlarged. The tumors are usually found near the trabeculæ and deeply seated, or at the periphery of the organ; in the latter case the capsule is thickened. Recent tumors have a reddish-gray color, and are more

<sup>1</sup> "Zwei Fälle von Maligner Lebersyphilis," *Inaug. Dissert.*, München, 1888.

<sup>2</sup> "Ueber die Visceralen Erkrankungen in der Frühperiode der Syphilis," *Monatsshefte für Prakt. Dermatol.*, 1892, vol. xv. pp. 481 et seq.

<sup>3</sup> *Charité Annalen*, vol. xviii., 1893, pp. 322 et seq.



dense and tough than the normal spleen-tissue ; when old they are dry and of a yellowish-gray color. When young they are less clearly defined than at a later period, when they may become distinctly encapsulated. The vessels and the structure of the organ in the neighborhood of the tumors are more or less destroyed. Cicatricial contraction, especially in the capsule, subsequently occurs. The spleen has several times been found adherent to the diaphragm in consequence of peritonitis from irritation by gummy tumors.

We know little of the **symptomatology** of this affection. Enlargement of the spleen is sometimes demonstrable, and in some cases, when the tumors are superficial, inflammation of the capsule and localized peritonitis occur.

In the cases hitherto observed the lesion has generally been accompanied by similar affections of other viscera, and the patients have suffered from cachexia or marasmus.

Gold<sup>1</sup> publishes the pathological results derived from the study of ten cases of late syphilis of the spleen. He also gives the literature of the subject up to the date of his essay.

## CHAPTER LXXV.

### AFFECTIONS OF THE STOMACH, INTESTINES, AND RECTUM.

#### The Stomach.

THERE are no symptoms which are pathognomonic of syphilitic lesions of the stomach. Syphilis of the stomach is of very rare occurrence, and it is generally recognized after death by means of the microscope. Many of the old cases reported in literature are so wanting in clinical and pathological data that they are of no scientific use. The cases of Cornil<sup>2</sup> and Chiari<sup>3</sup> are worthy of record. Cornil's case was that of a woman who had gummata of both liver and stomach. On the mucous membrane of the small curvature near the pylorus was a number of flattened reddish tumors of a diameter of from two to five centimetres. The gummata were developed in the submucous layer, and their structure consisted of a dense, compact, felt-like tissue formed of fasciculi of connective tissue infiltrated with small round cells.

Chiari's case was that of a man twenty-three years old and two years syphilitic, and who died of tuberculosis. He had suffered from gastric pains and vomiting. The stomach was the seat of numerous gummatous infiltrations and of an ulcer of about ten centimetres in diameter. In

<sup>1</sup> "Zur Kenntniss der Milzsyphilis," *Arch. für Derm. and Syph.*, vol. xii., 1880, pp. 463 et seq.

<sup>2</sup> *Leçons sur la Syphilis*, Paris, 1879, p. 406.

<sup>3</sup> "Ueber Magensyphilis," *Internat. Beitr. zur Wissensch. Med., Virchow's Festschr.*, 1891, pp. 295 et seq.

this case there were similar lesions in the intestines. Chiari states that gummatus lesions of the stomach may after ulceration become cicatrized.

Zavadski and Luxembourg<sup>1</sup> report the case of a man who suffered from vomiting and a sensation of heat near the xyphoid appendix, and died eight months after the onset of his illness. The stomach was the seat of a round ulcer, and the mucous membrane near it was very much thickened. Round-cell infiltration around the vessels in the submucous connective tissue was found by microscopic examination. Galliard<sup>2</sup> has also described round ulcers of the stomach resulting from syphilitic infiltrations.

### Intestines.

Our knowledge of the effect of syphilis on the intestines is based on post-mortem studies, and it is at best very meagre. The older writings of Oser, Meschede, and Wagner have shown that ulceration of the ilium may sometimes be found in old syphilitics.

Björnström reported the case of a man fifty-one years old who died of symptoms of acute peritonitis, in whom perforation of the large intestine was found. Besides, there were six ulcers, seated chiefly in the jejunum, which caused thickening of the intestinal walls.

Ulceration of the ilium and of the rectum, which was the seat of stricture, was found after death by Hahn<sup>3</sup> in a thirty-three-year-old woman who died of exhaustion.

De Michelé and Sorrentino<sup>4</sup> give the details of two autopsies in which firm, round, elongated patches with irregular ulcerated surfaces were found, together with great hypertrophy of the muscular fibres. The minute morbid appearances resembled those of gummata.

Hayem<sup>5</sup> and Tissier report the case of a woman presenting very extensive cutaneous lesions, who was in a typhoidal state and was delirious. After death several small circular ulcers were found in the cæcum, together with some cicatrices of previous lesions. These authors think that this case was one of typhoidal syphilis with intestinal lesions.

### The Rectum.

Syphilitic affections of the rectum are to-day not well understood, but it is possible to describe them in a clear manner. The facts here given were learned by me in the long observation of many women afflicted with vulvar, vaginal, and rectal syphilitic lesions.

Syphilis attacks the rectum in three distinct forms: first, early or rather late in the course of the disease by the extension of indurating oedema, which may accompany infiltrating or ulcerating lesions, and which tends to the production of more or less complete rings of connective tissue; second, by the formation of true gummatus infiltration; and, third, by the development of a form of inflammation with the production of new connective tissue, in which congestion and exudative products are

<sup>1</sup> *Gaz. Lekaroka*, 1893, vol. xiii. pp. 1233 et seq.

<sup>2</sup> "Syphilis gastrique, etc.," *Arch. gén. de Méd.*, Jan., 1886, pp. 66 et seq.

<sup>3</sup> *Deut. med. Wochenschrift*, 1892, vol. xviii. pp. 69 et seq.

<sup>4</sup> *La Riforma Medica*, Aug. 3, 1892, pp. 302 et seq.

<sup>5</sup> *Revue de Médecine*, April, 1889.

absent. This third form is a chronic productive or cellular inflammation of slow invasion and of persistent nature.

Indurating œdema complicates early and late syphilitic infiltrations and ulcerations which are seated in the vulva or vagina and near and in the anus. The indurating process then extends to and surrounds the anus, either between the two sphincters or about one, two, or three inches above the internal one. The walls of the rectum become thickened, less supple and extensible, than they are normally, and if proper treatment is not adopted in the course of several months or a year or two a tough and diffuse stricture is formed. This form of rectal stricture is usually found in syphilitic women in the secondary or early tertiary stage. It is generally the result of neglect of treatment of their lesions.

In some cases there are ulcerations which present points of resemblance to chancroids, and for this reason some authors speak of chancroidal stricture of the rectum. Chronic chancroids may produce stenosis of this tube, but it will generally be found that their bearers also suffer from syphilis.

This form of rectal stricture, if seen and treated early by local and systemic medication, is curable. Its **prognosis** is better in proportion as the infection is recent.

The second form of syphilis of the rectum may or may not result in stricture. The essential features of four cases of this affection observed by me will give a clear idea of its nature and course. The first case was that of a man thirty-three years old who, after a prolonged attack of diarrhœa, suffered from obstinate constipation and experienced an uneasy sensation in the rectum, particularly at the anus, when at stool and at various times during the day. About two inches above the sphincter, on the posterior wall of the rectum, a thickened patch of mucous membrane two inches long and one and a half wide, with sharp and abrupt margins, could be seen. The surface of this lesion was somewhat papillomatous, and its structure was firm. Under active local and general treatment resolution slowly took place, and a firm cicatrix which did not materially contract the tube was left.

The second case was that of a woman forty years of age who, besides having a well-marked tertiary lesion, complained of a sensation of a hindrance or impairment of the expulsive power in defecation. The anus was normal, but rather more than two inches above, on the anterior wall of the rectum, was a hard, firm patch or tumor of oval shape, of a diameter of fully two inches. It was elevated fully half an inch and had a convex, slightly papillated surface. There was slight tenderness in and around the tumor, but no abnormal heat nor discharge. On examination of the swelling bimanually with the fingers in rectum and vagina, it was found to involve the mucous membrane of the rectum and seemingly to encroach on the subcutaneous tissue between that and the vagina. Its shape was readily made out, and it was found to be distinctly movable. This woman was cured by treatment.

The third case was also that of a woman twenty-eight years old, who in the sixth year of syphilis complained of pain and uneasiness in the rectum, from which a discharge flowed. On examination I found the anus red and inflamed, and on introduction of the finger two inches into the rectum, on its posterior and lateral wall was a deep ulcer with thick-



ened and sharply-cut edges and of an area of fully two inches. This ulcer was very rebellious to treatment, but it finally yielded.

The lesion in this case was undoubtedly a gumma which underwent degeneration.

The fourth case was that of a twenty-three-year-old woman, syphilitic for five years. On examination, on the posterior wall of the vagina, about two and a half inches deep, was a ragged opening through which a probe could be passed into the rectum and withdrawn through the anus; there was also a stricture of the rectum about two and a half inches up. The woman stated that she had discovered a lump in the posterior wall of the vagina about two months before, which was not accompanied with pain. She had for several months previously suffered from the local effect of the stricture of the rectum.

I have seen several cases in which syphilitic infiltration of the posterior vaginal wall increased in depth and attacked the rectum, which as a result became stenosed.

The following somewhat similar cases, reported by Zeissl<sup>1</sup> and Zappula,<sup>2</sup> are worthy of record. Zeissl's case was that of a man syphilitic fourteen years, who presented a fungous mass growing from the scrotum. The slow, painless course of this lesion suggested its syphilitic nature. While under treatment for this affection the patient complained of pain in the rectum, attended by bloody and diarrhoeal discharges; very soon a brownish-black, ill-smelling mass was found protruding from the anus, which after removal proved to be composed of connective and elastic tissue. On digital examination a swelling the size of a walnut was discovered on the right wall of the rectum, from which a sanious pus could be expressed. Periosteal nodes were also present at this time. Zeissl concludes that the anal tumor was a syphilitic new growth, and that it was of exceptional importance on account of its occurrence in a male patient.

In Zappula's case of rectal stricture a cure was effected by the internal use of iodide of potassium. A case with a similar result is also mentioned by Allingham. The patient, a man thirty-six years of age, had gonorrhœa and an ulcer on the glans fifteen years before. Mercurial treatment was at once begun, and no lesion of syphilis subsequently appeared. Fifteen years later he began to suffer from pains to the right of the anus and in the right tuberosity of the ischium. Very soon the symptoms of rectal stricture became well marked, and so extreme was the intestinal obstruction that large fecal tumors formed, and could be felt through the abdominal walls. Upon examining the rectum with the finger smooth, elastic elevations of the mucous membrane were felt, rather in the form of folds than of condylomata or other adventitious deposits. Examination with the speculum showed the mucous membrane hypertrophied, uniformly swollen, and slightly mammillated. A sound could readily be introduced to a depth of 11 centimetres ( $4\frac{1}{2}$  inches), but there met an impassable obstruction. On a second examination there was found at a depth of 4 centimetres ( $1\frac{6}{10}$  inches) a painless swelling the size of a hazelnut, globular, smooth, and

<sup>1</sup> *Vierteljahr. für Derm. und Syphilis*, 1875, pp. 137 et seq.

<sup>2</sup> *Ann. univ. di Med.*, Milano, ccxiii., 1870; also *Arch. f. Dermat. u. Syph.*, 1871, p. 90.

elastic, which was situated beneath the mucous membrane and appeared not to adhere to the latter. The diagnosis lay between syphilis and cancer. Giving the patient the benefit of the doubt, he was placed upon antisyphilitic treatment, consisting of large doses of the iodide of potassium. In the course of twelve days the pain disappeared, the tumor diminished in size, natural stools took place, and the patient was at last completely restored to health.

The third form of syphilitic disease of the rectum is that of annular fibroid stricture, and it is not due to an essential syphilitic process, but it belongs in the category of parasyphilitic affections, in which this disease shows a tendency to productive and cellular inflammation. This occurs very frequently in the genitals of young, and particularly of old, syphilitic women long after the activity of the diathesis has ceased. In some cases the external genitals are the seat of the hyperplasia, and in others the vaginal walls are attacked.<sup>1</sup>

Either synchronously with the vulvar or vaginal affection, or in an uncomplicated state, this affection attacks the rectal wall and runs around it in ringed form. As has already been stated, there is no hyperæmia and there are no exudative products: there is simply this chronic productive inflammation, which goes slowly and persistently on, and inevitably leads to the formation of a dense, unyielding ring of fibrous tissue, which may in the end thoroughly occlude the gut. Why syphilis should thus lead to the cellular inflammation localized to a segment of the rectum, from three to six inches above the anus, we do not know. Nor do we know whether any traumatic conditions tend to thus localize this stenosing process. We do know, however, that in some syphilitic women a proctitis, differing in no particular from that found in uninfected women, occurs, and that it entails long suffering and may lead to death.

## CHAPTER LXXVI.

### VARIOUS RARE AFFECTIONS.

#### **The Parotid, the Sublingual Gland, the Thyroid Gland, the Pancreas, the Suprarenal Capsules, the Pineal Gland, and the Peritoneum.**

THE *parotid gland* may very exceptionally be attacked in the secondary and tertiary stages of syphilis. Neumann<sup>2</sup> has reported four cases in which this gland became much swollen at the same time that other manifestations were present on the body. The parotid infiltrations

<sup>1</sup> The clinical history and the pathological anatomy of the morbid process are fully given in my essay on "Chronic Inflammation of the External Genitals in Women," *New York Med. Journ.*, June 4, 1890.

<sup>2</sup> *Arch. für Derm. und Syphilis*, 1894, vol. xxix. pp. 3 et seq.

were cured by specific treatment. Lang<sup>1</sup> has also reported two cases of gummatous infiltration into the parotid gland.

The *sublingual gland* may be attacked early and late in the course of syphilis, but recorded cases are very rare. Neumann<sup>2</sup> has also reported a case in which a woman, syphilitic four years, presented a swelling as large as a nut of the sublingual gland, together with infiltration of the adjacent mucous membrane. In this case there was also an infiltration in one of the glands of Blandin-Nuhn, which are deeply seated in the tissue of the tongue near its tip on either side of the median line. Fournier<sup>3</sup> also reported the case of a man who in the eleventh year of syphilis presented a swelling of the sublingual gland which underwent resolution by the use of iodide of potassium for three months.

The *thyroid gland* may be the seat of gummatous infiltrations, but it is attacked much less frequently in acquired than in hereditary syphilis. In the case already referred to and reported by Fränkel (see page 754), besides syphilitic infiltration of the trachea a small gummatous nodule was formed in the right lobe of the gland. Lang also speaks of the case of a man who, besides general early manifestations, had a rather painful swelling of the size of a chestnut in the thyroid gland. The case of Pospeloff<sup>4</sup> is interesting and unique. It was that of a man, syphilitic six years, who had suffered from severe gummatous lesions and profuse diabetes insipidus, and who also presented cerebral symptoms. At this time gummatous infiltration into the testicles developed, and an elastic painless tumor of the size of a nut was felt at the upper third of the thyroid cartilage. These swellings disappeared under the influence of treatment in three months. But the man continued in bad health. He suffered severely with cold sensations, his hair fell out, and his nails became dry and brittle. He became apathetic and lost sexual desire. Soon the face assumed a waxy hue and was oedematous. These conditions, together with the absence of sweating for two years, disturbances of speech, paræsthesia of the extremities and of the back, presented a good picture of myxœdema. The patient was benefited by antisymphilitic treatment and several doses of thyroid extract. Pospeloff is disposed to attribute these disorders to cirrhosis of the thyroid gland, which followed the infiltration process.

The *pancreas*, alone or synchronously with visceral lesions, may be attacked by gummatous infiltration. Such cases have been reported by Rokitansky and Lancereaux. Chvostek<sup>5</sup> found in a case of syphilis of the skin and viscera cicatricial condensation of the tail of the pancreas.

The *suprarenal capsules* have in a few cases been found to be the seat of connective-tissue increase and gummatous infiltration. Gordon reports a case in which during life the morbid conditions of Addison's disease were observed, and at the autopsy what appeared to be gummatous degeneration of the suprarenal capsules was found. (See also page 641.)

<sup>1</sup> *Wien. med. Wochenschrift*, 1880, No. 9, and *Vorlesungen über Path. und Therap. der Syphilis*, Wiesbaden, 1895 (first part), p. 295.

<sup>2</sup> *Op. cit.*

<sup>3</sup> *Annales de Derm. et de Syph.*, vol. vii. pp. 81 et seq.

<sup>4</sup> *Medizinskoïe Obozrenië*, 1893, No. 22.

<sup>5</sup> *Wien. med. Wochenschrift*, 1877, No. 33.



The *pineal gland* has been found to be the seat of gummatous infiltration by Birch-Hirschfeld<sup>1</sup> and Weigert.<sup>2</sup>

*The Peritoneum.*—Primary syphilitic changes in this membrane have not been found. It is sometimes the seat of cellular infiltration by the extension of the syphilitic processes, which attack the intestines and viscera.

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## CHAPTER LXXVII.

### AFFECTIONS OF THE MUSCLES, OF THE TENDINOUS SHEATHS, AND OF THE APONEUROSES AND BURSÆ.

#### Myositis.

MYOSITIS is sometimes found in secondary syphilis, but generally in the tertiary stage. It occurs in three principal forms: first, the irritative or hyperæmic; second, the chronic infiltrative; and, third, in the form of gummatous nodules.

Irritative myositis is usually seen to coexist with the early manifestations, particularly of the larger joints and tendons, and it is attended with rheumatoid pain, soreness, and perhaps impairment of function. The myalgias produced by the early irritative syphilitic process are, as a rule, ephemeral and readily yield to proper treatment. In this form of myositis no permanent structural change is produced.

Chronic myositis tends to more or less permanent contraction of the member or parts on or in which the muscle is situated. It occurs in two forms—the localized and the diffuse.

According to Virchow, this lesion is analogous to that produced by rheumatic inflammation. "In the interspaces between the muscular fasciculi a connective tissue is developed, which hardens and results in atrophy, and finally in the destruction of the primitive muscular fibrils." We thus find at the outset the presence of abnormal nuclei, cells, and fibres in the cellular tissue, and afterward a secondary degeneration of this new formation, resulting in atrophy of the normal elements, contraction of the muscle itself, and in some instances calcareous and bony deposits. This lesion usually escapes observation until the contraction of the muscle, interfering with motion or producing flexion of the limb, attracts attention.

One or more muscles may be attacked. Those most frequently affected are the flexors of the upper extremity, and especially the biceps. Notta met with six cases, in two of which the disease was confined to the biceps; in two others, to the biceps and supinator longus and; in the remaining case to the flexors of the fingers. The biceps has been affected with the same frequency in the cases reported by other observers.

<sup>1</sup> *Lehrbuch der Path. Anat.*, vol. ii., 1887, p. 472.

<sup>2</sup> *Archiv für Path. Anat.*, vol. lxxv. p. 223.

In each of the ten cases reported by Mauriac<sup>1</sup> the biceps was the seat of this affection; in nine it was the only muscle involved, while in one case the triceps was attacked at the same time. In seven of these cases the left biceps was affected, in two both right and left, and in only one was the muscle of the right side alone affected. When both biceps and triceps are involved muscular ankylosis of the elbow results.

The contraction comes on insidiously, and the first symptom noticed by the patient is an inability to extend the limb. On examining the affected muscle no change is perceptible by palpation either in its size or texture; its power of contraction is normal; and there is simply a diminution in length, as shown by its tension when the limb is forcibly extended. The tendon of insertion of the biceps is always prominent and tense, and the muscle itself appears to be in a state of partial contraction.

Pouley<sup>2</sup> has reported a case in which muscular contraction was so severe that the thighs were drawn up to the abdomen and the legs up to the thighs.

In neither of Notta's<sup>3</sup> six cases was the fleshy portion of the muscle sensitive to pressure, but in five pain was excited by pressing upon one or both of the tendinous insertions and by forced extension.

According to Mauriac, spontaneous pain was absent in some cases, while in others the muscle was the seat of a dull aching sensation which was subject to exacerbations. In other instances the patients suffered from neuralgia of the muscle or other parts. The contraction increases, slowly in most cases, but rapidly in some, up to a certain point, when it remains stationary. In five cases in which the biceps was affected, the angle formed by the arm and forearm, when the latter was extended to the utmost, measured 160°, 135°, 130° and 90°, respectively. In another case the ring and little fingers were completely flexed upon the palm of the hand.

In none of Notta's cases had the patients ever suffered from rheumatism, which, therefore, could have had no part in producing the muscular contraction, but all presented unquestionable syphilitic symptoms, which in three belonged to the tertiary period, in two to the secondary, and in one to both the secondary and tertiary periods.

Mauriac, however, regards this as a precocious rather than a tertiary affection. He has observed it as early as the second and as late as the fifteenth month of syphilis, and thinks that we may fix upon the tenth month as the average date of its appearance. It occurs in the mild rather than in the severe cases of syphilis. He thinks that rheumatism has no etiological relation to this affection, which is myo-neuropathic in its nature; in other words, syphilis affects the peripheral nerves and muscles. The intensity of the diathesis has slight influence upon its development; of nine cases, but one was severe, five were mild, and three were of medium severity. It is accompanied by non-ulcerative more frequently than by ulcerative lesions.

This affection may last months or years, and, while it yields with

<sup>1</sup> *Leçons sur les Myopathies syphilitiques*, Paris, 1878.

<sup>2</sup> *Medical Compend*, Jan., 1890.

<sup>3</sup> "Mémoire sur la Rétraction musculaire," *Arch. gén. de Méd.*, Dec., 1850, pp. 413 et seq.

moderate promptness to treatment, it is capable also of spontaneous cure. Its course is not always uniform, since it is liable to remissions and relapses.

According to Neumann,<sup>1</sup> the sphincter of the anus is more frequently attacked than the biceps. This affection, he says, is developed earlier than other myosites, and is seen mostly in women. The symptoms are pain and tenesmus during and after defecation. The totality of the muscle is not involved, since some fibres may be spared. Neumann says that the lesion begins in changes in the vessels of the perimysium, and it may produce serious trouble.

### Gummatous Tumors.

These tumors begin in round-cell infiltrations around the vessels of the perimysium. They grow slowly and usually without pain, and reach various sizes, and sometimes, as in Koehler's<sup>2</sup> case, they involve a large mass of muscles. In this case the tumor extended from the left hypochondrium to the inguinal fold, and from the linea alba to the axillary line. In Netter's<sup>3</sup> case the tumor was seated in the sartorius muscle, was subaponeurotic, and was five inches long by four inches wide. These tumors are of various shapes, globular, fusiform, flat, or irregular, according to the nature of the parts in which they are seated. When superficial they become adherent to the aponeurosis, which becomes inflamed and hypertrophied. Being frequently developed near the ends of the muscles, the tendons are sometimes secondarily involved.

They are most easily detected when the muscle is relaxed, and their independence of the subjacent bone can then be best established. They excite little or no pain, unless the muscle be put upon the stretch, and their chief inconvenience is due to their interference with motion. They sometimes produce contraction of the muscles, but this is not a necessary result.

They usually appear late in the disease, but Mauriac has seen them in three cases as early as three and five months after infection, and I have observed a tumor in the sterno-mastoid muscle in the fourteenth month of syphilis. These gummatous tumors of the muscles may, in exceptional cases, undergo softening, break down, and form deep ulcers.

They are very often accompanied by other syphilitic manifestations, such as nodes, exostoses, tubercles of the cellular tissues, or ulcerations of the fauces.

Their **prognosis** is good, particularly if they are treated early.

The diffuse and the localized myosites are rather rarely found in combination. Ostermeyer<sup>4</sup> has published an interesting case in which the triceps muscle was thus attacked, and in which suppuration occurred.

<sup>1</sup> "Beitrag zur Kenntniss der Myositis syphilitica," *Arch. für Derm. und Syph.*, 1886, pp. 19 et seq.

<sup>2</sup> *Berl. klin. Wochenschrift*, No. 8, 1892, pp. 162 et seq. Being diagnosticated as sarcoma, this mass, with part of the diaphragm, was exsected. When it was found that this lesion was not sarcomatous, the man was put upon antisyphilitic treatment and cured. The left side of the abdomen was only covered with integument after the operation.

<sup>3</sup> *Archives gén. de Méd.*, 1880, pp. 218 et seq.

<sup>4</sup> *Arch. für Derm. und Syphilis*, 1892, *Ergänzungsheft*, pp. 13 et seq.



### **Affections of the Tendinous Sheaths and of the Tendons and Aponeuroses.**

These structures are sometimes attacked in early and in late syphilis. In the early stage, and in the second and third years of syphilis, these parts may be the seat of an irritative process which may give rise to effusion or to the development of fibrous tissue. In tertiary syphilis they sometimes become infiltrated by gummatous deposits.

We sometimes see swellings which occur on the backs of the hands, and which follow the course of the tendons, but never extend beyond the dorsal ligament; they are of triangular shape, with their base toward the fingers. They are due to effusion and yield a sensation of fluctuation; they cause little, if any, pain, unless of unusually large size, when the skin over them may be inflamed and painful. They occur in the early years of syphilis and are developed rapidly.

The tendons of the wrist, ankle, foot—in fact, any tendon—may be thus attacked. The lesion is a hyperæmia of the sheath attended by serous effusion. The shape of the resulting tumors varies according to the conformation of the parts.

They are firm and elastic and sometimes fluctuate. The overlying skin is frequently reddened. They form rapidly, and are often attended with pain. Fournier believes that many of the early pains of syphilis are due to hyperæmia of the sheaths of the tendons, and especially that the pain sometimes present in the bend of the elbow, intensified by firm pressure, is due to inflammation of the tendon of the biceps.

Tendons may, in rare cases, be the seat of gummy infiltrations, which exist in the form of small subcutaneous tumors, usually unattended by spontaneous pain. After remaining indolent for a long time they may break down and form troublesome ulcers. Van Oort cites a case of gummy tumor of the third extensor tendon seated over the middle of the metacarpal bone. Such a tumor might be mistaken for simple ganglion. When the tendon is attacked near a joint the latter may be secondarily involved.

The tendons are also subject to gummatous changes near their insertion and in their thicker portions. The larger tendons and those most constantly in use are most frequently involved. Sabail reports a case of gummy tumor involving the tendo Achillis of each leg. Nélaton has twice found them in the tendon of the triceps cruris, and cases are on record in which the ligamentum patellæ, the tendon of the sterno-mastoid muscle, the anterior tendon of the thigh, and the flexor tendons of the legs were thus affected. Finally, Bouisson has reported a case of strabismus due to a gummy tumor in the tendon of one of the orbital muscles.

The aponeuroses may be the seat of localized or diffuse fibroid infiltration.

### **Affections of the Bursæ.**

The bursæ are rather infrequently attacked by irritative and hyperplastic processes in secondary and tertiary syphilis.

In the secondary period, sometimes coincidently with the onset of general manifestations, one or more bursæ are affected. As a result, we find decided swellings—not, however, very sharply definable—under the skin, which may or may not be hyperæmic. These early bursal

swellings on palpation yield a fluctuating or a doughy sensation. They are sometimes rather sensitive, but not, as a rule, painful. They disappear promptly under specific treatment, provided the parts on which they are seated are put at rest and are not subjected to pressure. Interesting cases of this early form of bursitis have been reported by Tröst<sup>1</sup> and Buechler.<sup>2</sup> In the first five years of syphilis hyperplasia of bursæ somewhat rarely occurs in the form of quite sharply-circumscribed, rather firm tumors, which run an indolent and painless course until affected by local and general treatment. This variety of bursitis, an interesting case of which I have reported,<sup>3</sup> is, I am led to think, an intermediate form between the irritative and the gummatous.

In the tertiary stage affections of the bursæ are not infrequent. The bursæ over the patellæ are most commonly attacked. The lesion is a gummous infiltration with formation of connective tissue. It begins insidiously and without pain; the patient's attention is first attracted by a hard movable lump beneath the skin. It varies in size and shape in different bursæ. Over the knee-joint we have found tumors as large as a walnut or as an egg. The tumor may remain indolent for a long time, giving very slight discomfort. In some cases it is excessively hard, in others it is quite elastic. Sometimes the parts seem to be infiltrated with fluid. If not treated, and particularly if subjected to irritation, the tumor grows and becomes adherent to the overlying skin. Inflammatory symptoms appear and the integument over the bursæ ulcerates. The inflamed and infiltrated bursa may sometimes be seen at the base of the ulcer. Under such circumstances the course of the lesion is very tedious. In other cases, even of very large tumors, treatment causes their absorption within two or three months. The lesion may be unilateral, but frequently attacks both patellar bursæ. In many cases traumatism is an important exciting cause; in others the bursæ are secondarily involved by the extension of gummatous infiltration from adjacent parts. Relapses are quite frequent.

Keyes<sup>4</sup> collected the histories of 12 cases; in 3 the bursæ of both patellæ were involved, and in 2 the bursa of one patella only was affected; that over the tuberosity of the tibia once; that between the insertion of the semi-tendinosus and the lateral ligament of the knee, double once and single once. In the other 4 cases the bursitis was unilateral—once over the malleolus, once beneath a corn, once in the palm of the hand, and once over the olecranon. It occurs most commonly in women. Gummatous bursitis appears both early and quite late in tertiary syphilis.

<sup>1</sup> *Wiener med. Wochenschrift*, 1889, p. 642.

<sup>2</sup> *Medicin. Monatshefte* (New York), Aug., 1889.

<sup>3</sup> *Journal of Cutaneous and Venereal Diseases*, vol. i. p. 311.

<sup>4</sup> *Am. Journ. Med. Sciences*, 1876, pp. 349 et seq.

## CHAPTER LXXVIII.

## AFFECTIONS OF THE BONES AND JOINTS.

THE bones are sometimes attacked in the secondary period of syphilis, but osseous affections are more common in the tertiary stage. While the secondary lesions of the bones are usually cured very readily, those of the tertiary period are very persistent and prone to undergo degenerative changes.

According to Cornil,<sup>1</sup> the pathological changes in bones are osteoperiostitis, rarefying osteitis, and intense rarefying osteomyelitis or gummatous osteoperiostitis. From these morbid conditions formative osteitis, or eburnation, exostoses, or nodes, necroses, and sequestra result.

Syphilitic osteoperiostitis is very similar to the simple form. It is limited to the superficial layers of the bone and to the periosteum, and chiefly attacks the long bones and the cranial bones.

The affection begins in the connective tissue and around the vessels of the Haversian canals. Thus the parts are infiltrated with numerous round cells. Besides the cell-infiltrations into the periosteum, the membrane is also œdematous. These conditions are found in the early stages of osteoperiostitis. In the bones the Haversian canals become enlarged and filled with marrow, which is either red or embryonal or gray and gelatinous. In the stage of œdematous infiltration osteoperiostitis may undergo resolution from the effect of specific treatment.

When the process becomes old the newly-formed cells act as osteoblasts and new bone-tissue is formed. As a result, we find swellings of the bones, which are called exostoses and periostoses. This hyperplastic process is called formative osteitis or eburnation.

In ramifying osteitis the subperiosteal tissue and the osseous marrow contain small round cells and transuded red corpuscles. When this exudation of cells is intense, the bone-tissue becomes eroded and destroyed upon the internal surface of the Haversian canals. The osseous lamellæ are destroyed, and replaced by inflamed marrow. Under treatment this process may be stayed and cured.

Gummatous osteomyelitis and osteoperiostitis are more advanced conditions than those just described: the subperiosteal embryonal tissue and the medullary tissue are much more abundant, and these structures become arranged like that of gummata.

**Osteoperiostitis.**

The bones most liable to be attacked by osteoperiostitis are those which are the most superficial, as the tibia, ulna, clavicle, sternum, and cranium, but no portion of the skeleton can be said to be exempt. The external manifestation of this affection consists in ill-defined, doughy tumors of variable size, shading off gradually into the surrounding tissues, adherent to the osseous structure beneath, but independent of

<sup>1</sup> *Op. cit.*, pp. 239 et seq.



the overlying integument, usually very sensitive to pressure, the seat, at certain hours in the twenty-four, of severe pain, and bearing the common name of nodes. A striking peculiarity of the pains produced by nodules is their marked nocturnal character. They are generally absent or are scarcely felt during the day, but return at night with great severity after the patient retires to bed, and only abate toward morning. This nocturnal exacerbation is attributed to the warmth of the bed by Ricord, who states that in bakers and others, who are obliged by their occupation to turn day into night, the pains are chiefly diurnal. This explanation, however, does not appear to hold good in all cases, for in some they return at a certain hour in the evening whether the patient has or has not retired, and in a few instances they are equally as severe during the day as at night. These pains sometimes exist without the appearance of any organic lesion, and in such instances have been regarded as the direct effect of syphilis, but it is extremely probable that they are always dependent upon changes, however slight, in the periosteum or bone. The student should notice the difference between these pains and those attending early secondary symptoms, the former being confined to certain regions, usually the continuity of the long bones and those portions of the skeleton which approach nearest the surface, and nocturnal in their character, while the latter affect by preference the neighborhood of the joints, and rapidly change their locality from one part of the body to another.

The swellings produced by syphilitic osteoperiostitis are, as already stated, called nodes, in contradistinction to the more compactly-developed exostoses.

In the majority of cases of nodes the infiltration is absorbed under appropriate treatment and the tumor undergoes resolution. In other cases the inflammation is more acute; the skin becomes adherent to the tumor, is reddened and thinned; degeneration and softening take place and an opening is formed; the ulcer shows little or no tendency to extend, but a superficial portion of the bone to a limited extent usually becomes necrosed and comes away, and an adherent cicatrix is the final result.

### Exostoses.

When eburnation of the bony tissue is developed the result is an exostosis. Such new growths are often, for a time at least, movable upon the bone beneath, and are then called *epiphysary exostoses*. In this form they are due rather to periostitis than ostitis; they are generally of small size, sometimes thin and flat, sometimes hemispherical or pedunculated, and at times annular. They acquire greater consistency with time, and finally present an eburnated texture. Arrived at this point, resolution is no longer possible; the tumor remains stationary, and treatment has no other effect than to quiet the osteocopic pains. If resolution be attained at an early period, their surface, which before was smooth, becomes irregular, indicating partial absorption. Sometimes this absorption continues after the whole of the tumor has disappeared, so that local atrophy of the bone succeeds the exostosis. In other instances syphilitic exostosis is not preceded by periostitis, but is

the result of osteitis terminating in hypertrophy of the normal bony tissue, in which case it is denominated *parenchymatous exostosis*.

An exostosis situated externally rarely occasions sufficient inconvenience or deformity to necessitate its removal by an operation unless under peculiar circumstances.

Exostosis may spring from the internal surface of the cranial bones, and give rise to symptoms of the most serious character, as convulsions and the various forms of paralysis. The frontal bone is by far the most frequently affected in this manner.

Syphilitic exostosis of the vertebræ, either external or within the spinal canal, is rare.

Syphilitic exostoses may generally be distinguished from similar growths due to other causes by the nocturnal pains attending them, by their usually occupying the continuity of the more superficial bones, by their hemispherical form, and by the fact that they are rarely multiple or symmetrical on opposite sides of the body.

### Gummatous Osteoperiostitis and Osteomyelitis.

The bones most commonly attacked by these processes are the long bones, the cranial bones, and the bones of the fingers and toes.

When the bones of the skull are affected, one or more nodes are developed. As a rule, in the late secondary and in the early tertiary stages we find several or, in rare cases, as many as twenty, nodes on the cranial bones, whereas at late periods there may be but one or two. These multiple cranial nodes usually make their appearance by crops of one or more. Single nodes run a slow course, and one may be followed by its successor after the lapse of months or years.

In Fig. 222 multiple gummatous nodes are well shown. In Fig. 223 many of the clinical features of bone-syphilis are graphically portrayed. On the right forehead there is a very large rounded node, while on the left forehead is an eroded cicatrix of bone which followed a gummatous ulceration which developed and underwent necrosis, together with ulceration of the overlying skin. To the left of this necrotic patch the skin may be seen to be the seat of a pigmented cicatrix, which also shows the site of a broken-down node. These cranial nodes followed each other at intervals of one, three, and five years. The sunken nose shows that necrosis of the nasal bones had also taken place.

The bones of the face, particularly the malar bones, may be attacked by gummatous osteoperiostitis, and in the course of the affection mild or severe neuralgic pain may be felt.

The superior maxillary bone is not infrequently attacked. The first symptoms are local swelling and pain, and later on the cheeks and the tissues around the eyes become red and cedematous. Very often the whole bone is destroyed. In some cases the periosteum is left intact and a new bone forms.

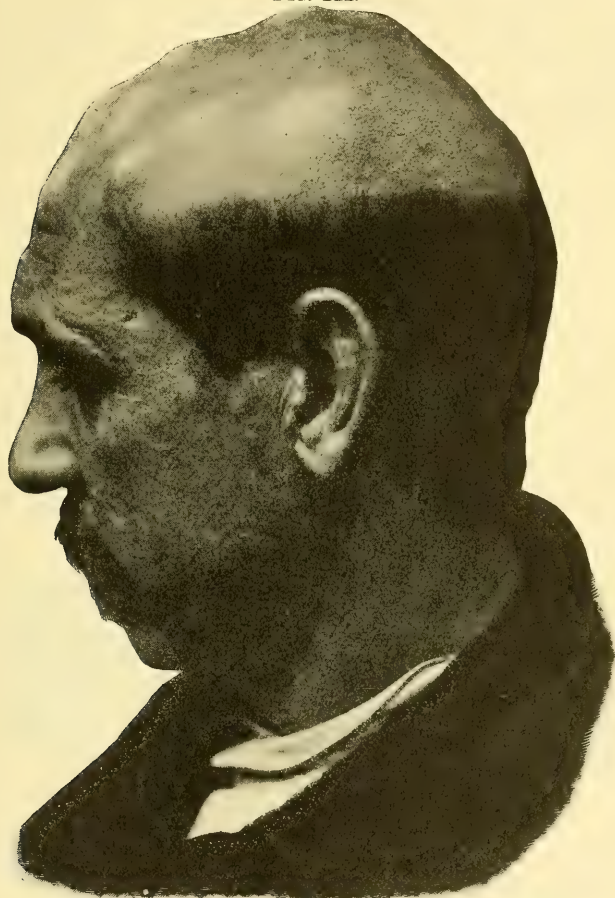
The inferior maxillary may be the seat of nodes on its external surface or lower border. According to Chabaud,<sup>1</sup> rarefying osteitis may occur in this bone and destroy the alveolar arches. Spontaneous fracture has been

<sup>1</sup> *Thèse de Paris*, 1885.

observed in cases of gummatous osteoperiostitis of the inferior maxillary bone.

The clavicle, scapula, and ribs are not uncommonly the seat of nodes of varying sizes. Follet<sup>1</sup> brings out the fact that gummata of the scapula may be mistaken for cold abscess and osteosarcoma, and suggests that it is always well to think of syphilis in cases of swellings on this bone.

FIG. 222.



Gummatous osteoperiostitis: multiple nodes of the skull-bones.

A goodly number of cases of gummatous osteoperiostitis of the vertebræ have been published. In these cases pain caused by pressure on the nerves was complained of, and in some cases there was paralysis of the upper or lower extremities.

Jasinski<sup>2</sup> has reported several interesting cases, and has given the bibliography of this subject up to 1891.

The bodies of the vertebræ are much more frequently attacked than

<sup>1</sup> *Thèse de Paris*, 1884.

<sup>2</sup> "Ueber Syphilitische Erkrankungen der Wirbelsäule," *Arch. für Derm. und Syph.*, vol. xxiii. pp. 409 et seq.

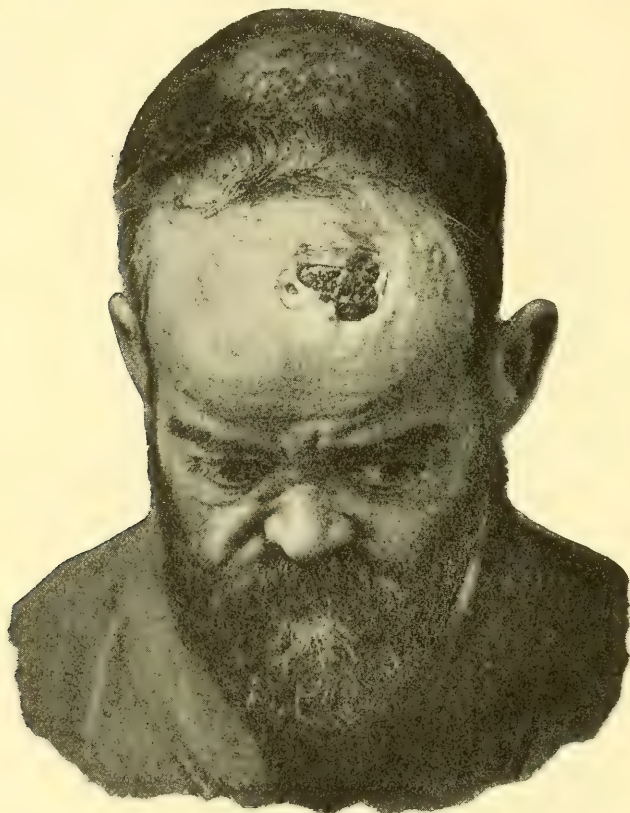


are the arches. In a number of cases of syphilis of the vertebræ strikingly beneficial results have followed the use of the mixed treatment.

*Fragility.*—As the result of local inflammation and cell-infiltration in cases of rarefying and gummatous osteoperiostitis the structure of bones sometimes becomes fragile, and they may be fractured by muscular contraction or mild or severe traumatism.

Prévost<sup>1</sup> has carefully studied, both clinically and microscopically, the

FIG. 223.



Showing a large cranial node, necrosis of skull, and cicatrix of skin.

subjects of spontaneous fracture and of the non-union of fractured bones in syphilitic subjects. He concludes that non-union is either due to a depraved condition or to the fact that the newly-formed embryonal tissues do not produce an ossifying callus, but, on the contrary, caseous, fatty, and sclerotic tissues, which tend to produce false joints. In these cases local and general medication and good hygiene are very essential.

Charpy<sup>2</sup> in chemical examinations of fractured syphilitic bones found all the constituents in normal quantity except fluoride of lime, which was markedly deficient. He therefore suggests this as a possible cause.

<sup>1</sup> *Thèse de Lille*, 1886.

<sup>2</sup> *Annales de Derm. et de Syph.*, 1885, pp. 269 et seq.

### Affections of the Joints.

The joints are frequently affected by syphilis in both the secondary and tertiary stages. In some instances the morbid process begins in the joint-structures, and in others inflammation of the articular ends of the bones and of the large tendons inserted near the joints involves the latter secondarily.

*Synovitis of the Late Stage.*—The synovitis which occurs late in the secondary and during the tertiary stage is also markedly subacute. It is attended with the same symptoms, and is mainly distinguishable from that of the earlier period by appreciable lesions of the joint-structures. The attention of the patient is called to the affection by slight pain and impairment of motion, and the joint is then found somewhat enlarged. The effusion into its cavity takes place slowly and perhaps intermittingly, so that in many cases several months elapse before the joint is very decidedly enlarged. When the affection is fully developed we find evidence of intra-articular effusion and general thickening of the fibrous coverings and of the synovial membrane. The affection has been called by Richet,<sup>1</sup> who first described it as “syphilitic white swelling,” and it was said by him to be due to gummy infiltration into the subsynovial connective tissue and into the reflections of the membrane which lines the joints.

It is probable that this is the chief focus of the lesion, but in some cases there is a coexisting hyperplasia of the fibrous structures of the parts. This affection may remain in an indolent condition for years without undergoing any further changes. There is little tendency to complete ankylosis, though quite frequently there is more or less erosion of the articular cartilages, as shown by the crepitation on motion. We seldom find sinuses near the joints, and the stationary character of the affection is in marked contrast to the tendency to degeneration which is such a prominent feature of the strumous affections of these parts. The knee-joint is the one most commonly attacked.

Late syphilitic synovitis may be complicated by tuberculosis, and the mixed condition then produced is very rebellious to treatment, which is sometimes signally efficacious in the true syphilitic affection.

In many cases a history of syphilis points to the nature of the affection. Then in tuberculosis this morbid process usually exists elsewhere, particularly in the lungs. In the mixed form of synovitis it is often impossible to make a sharp diagnosis.

The **prognosis** of this affection is rather more serious than that of the earlier form. If it is submitted to treatment early, it is in general curable, but if it is neglected, permanent thickening occurs, and consequently more or less impairment of motion.

The constitutional **treatment** consists in the administration of the iodide of potassium and of mercury. Locally, frictions with mercurial ointment may be used.

In some cases in which there is a syphilitic affection of the tendons inserted near a joint there is a coincident effusion into the cavity of the latter. This occurs slowly and painlessly, and disappears on the subsidence of the disease of the tendon.

<sup>1</sup> “De la Tumeur blanche,” *Mémoires de l'Acad. de Méd.*, Paris, t. xvii., 1853, pp. 249 et seq.

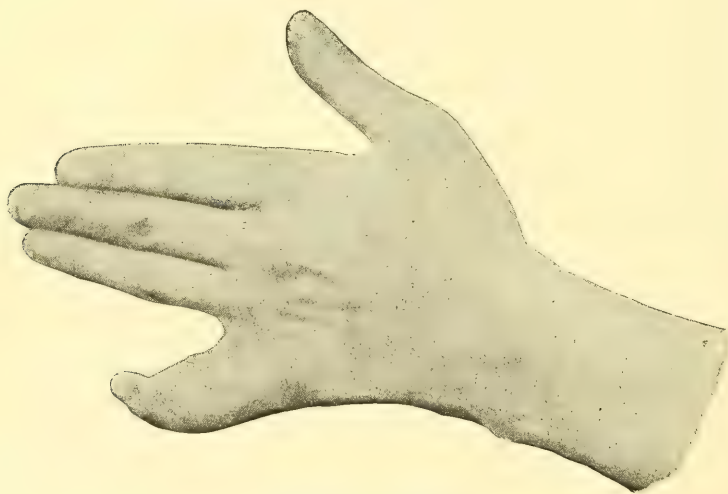
## CHAPTER LXXIX.

## AFFECTIONS OF THE FINGERS AND TOES.

BESIDES being the seat of primary and secondary lesions, the fingers and toes are, in the tertiary period, attacked by gummy deposit in their subcutaneous connective tissue and by infiltration and inflammation of their bones. This affection was formerly called syphilitic panaris. I use the term *dactylitis*, derived from the Greek *δακτυλος*, a digit or finger, as being more correct and expressive.<sup>1</sup>

The affection is caused both by acquired and by hereditary syphilis. The cases due to the former are much less numerous, there being under four dozen reported up to the present time, whereas hereditary dactylitis is by no means uncommon. In this section the acquired form will be described. Of this there are two varieties: First, that in which the subcutaneous connective tissue and the fibrous structures of the joints are involved; second, that in which the morbid process begins in the bones

FIG. 224.



Dactylitis syphilitica.

and periosteum, secondarily implicating the joints, and perhaps accompanied by deposit in the subdermal connective tissues. These varieties are constantly found, and their adoption will simplify description. The size of the affected member is materially increased and its mobility is more or less interfered with. The lesion comes on slowly, and first attracts the patient's attention by the slight enlargement of one or more fingers or toes. The swelling gradually increases and the member becomes hard and firm. When the toes are affected, their whole length is generally

<sup>1</sup> "On Dactylitis Syphilitica," *Am. Journ. of Derm. and Syph.*, 1871, pp. 1 et seq.



included; but when a finger is attacked, the lesion may be quite sharply limited to one phalanx, almost invariably the proximal one, or the adjacent phalanx may be involved to a less degree. (See Fig. 224.) The distal phalanges and the metacarpal bones may also be attacked (see Fig. 225), or, finally, the whole finger may be affected. Fig. 224 shows this infiltration into the first and second phalanges of the left hand.

A finger or a toe thus attacked presents a reddish, violaceous appearance, and to the touch is quite resistant and tense, the normal lines of the integument being effaced. Unlike gummy tumors developed where

FIG. 225.



Dactylitis syphilitica.

the connective tissue is plentiful, and which are isolable and movable, these infiltrations of the fingers and toes are firmly attached to the skin, the process apparently involving the corium even to its papillary layer. In most cases the thickening is greatest on the dorsal aspect, very rarely being equally copious on the palmar or plantar surface. The swelling, as a rule, ends abruptly at the metacarpo-phalangeal joint.

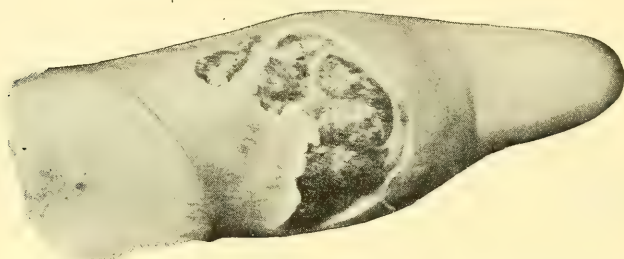
These swellings are usually developed slowly and painlessly, but in some cases a dull aching pain is present. When the infiltration is complete it is impossible, on account of the density of the tissues, to determine accurately the condition of the bones, although they seem to be thickened. As the affection subsides the bones and joint-structures can be more thoroughly examined, and we then find more or less periosteal thickening. In most cases, however, the bones are quite superficially involved, whereas in the second form of dactylitis they are profoundly attacked. It is impossible to say whether the morbid process begins in the periosteum or in the connective tissue over it; it is certain that the lesion is sometimes sharply limited to the tissues over one or more phalanges, and, again, it may involve the whole member.

Within a few weeks after the development of the affection symptoms of joint-implication appear. At first flexion of the joints is impaired by the swelling. In the course of one or two months, if no treatment is followed, the joints become flaccid and unnaturally mobile. Sometimes in this variety of dactylitis there is slight hydrarthrosis and often crepitation in the metacarpo-phalangeal joint or between the articular surfaces

of two phalanges. This will be again referred to in speaking of the second form of dactylitis, next to be described.

This gummous infiltration of the integument and periosteum of the fingers and toes may be limited to one of these members or may involve several. A single hand or foot, or both, may be involved, one or more fingers and toes being attacked simultaneously or in succession. (See Fig. 226.) The lesion, being a late manifestation, very often follows or accompanies gummous infiltration elsewhere. It runs a chronic course, and in its early stage is amenable to treatment. The fact that gummy tumors of these parts are not prone to ulcerate is incapable of positive explana-

FIG. 226.



Dactylitis of the second phalanx with gummatous deposit in the skin, which has ulcerated.

tion. The character of the deposit is certainly not peculiar, but it may be that the vascularity and density of the tissues modify the course of the lesion. The wonderful reparative power of the fingers after injury is well recognized. This form of dactylitis generally results in restoration of the affected members, but in neglected cases the joints may be rendered permanently useless and the bones may remain enlarged. The nails either escape or, in very chronic cases, present minute transverse furrows, indicative of impaired nutrition.

The first form of dactylitis is sharply limited to the bone, and is due either to specific periostitis or osteomyelitis. The affection may progress rapidly, slowly, or with intermissions. The earlier after the infection the lesion occurs, the more acute is its course. The degree of its induration is generally in proportion to the chronicity of its development; a rapidly-formed swelling may be so soft as to be susceptible of indentation by firm pressure. The affection may be speedily cured by energetic and early treatment, but if unchecked it may progress to an extreme degree. It seems to be the rule that when only one bone is affected the swelling is greater than when several are. The shape of the swelling depends upon the phalanx attacked. When the first is involved it may assume an acorn-shape or the appearance of a balloon; the second and third phalanges may be fusiform or cylindrical. In most cases the whole bone is involved. The disease may be limited to the extremity of a phalanx adjacent to one already the seat of dactylitis.

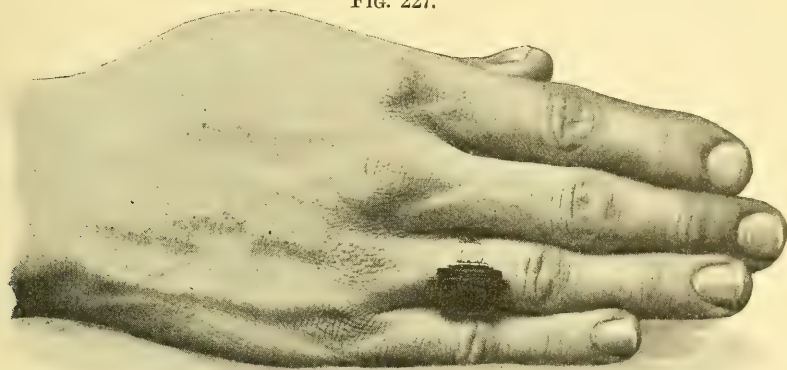
The proximal phalanx is most frequently, the distal phalanx least frequently, involved. I have seen in four instances enlargement of the second phalanx only, and of the third in one case. In hereditary syph-

ilis it is not uncommon to find swelling of the second and even of the third phalanges.

The fingers are attacked more commonly than the toes; in a few cases they have been involved simultaneously. More than one phalanx of the same finger may be affected, as well as several fingers, either unilaterally or symmetrically. In the latter case swelling of one or more toes is likely to occur at the same time. Other osseous lesions may coexist, and articular affections and gummous infiltrations of the skin may be associated with these lesions of the fingers.

The metacarpal, and less frequently the metatarsal, bones become swollen coincidently with dactylitis, or they alone may be affected. (See Fig. 227.) The extremity joining the phalanx or the opposite extremity may be involved.

FIG. 227.



Enlargement of the metacarpal bone of the index finger.

The mode of invasion and the course of these swellings are similar in the metacarpal bones and in the bones of the fingers. The metacarpal bones of the thumb and index fingers are those most frequently the seat of dactylitis. (See little finger in Fig. 225.)

The integument is rarely infiltrated in this form of dactylitis, gummous deposit having been found in the subcutaneous tissues in but two cases of primary lesion of the bones. The skin may undergo very little change, unless the swelling is excessive, when it becomes tense and thinned and the normal furrows are effaced. When the process is rapid the skin becomes red and inflamed; when the growth of the lesion is slow the skin accommodates itself, and very slight if any inflammation occurs. In some cases ulceration takes place or an incision is required to relieve the tension. The inflammatory focus is always on the sides of the fingers. In case an opening forms or is made, a soft cheesy detritus mixed with pus comes away. Necrosis may occur, but the destruction of bone-tissue is usually limited, and after a short time the fistula closes. In the majority of cases resolution of the bony swelling takes place.

The joint-structures are generally much thickened. After the dactylitis has existed about a month crepitation may be detected from friction of the articular surfaces. This is undoubtedly due to erosion of the

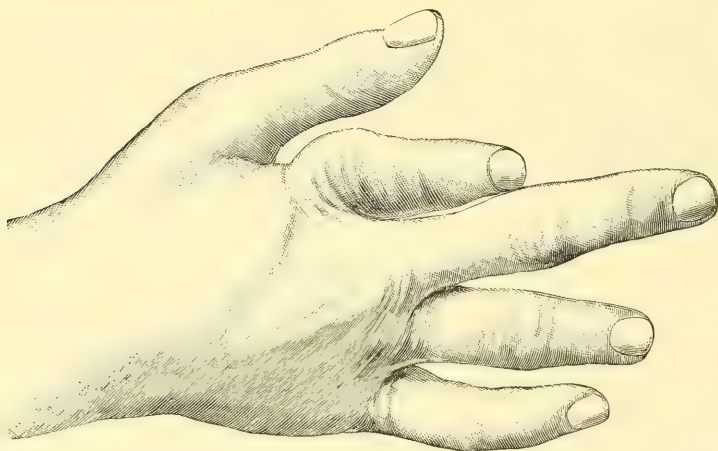


articular cartilages in consequence of impaired nutrition. In some cases an effusion into the joint-cavity takes place, slowly and without pain. This condition of hydrarthrosis varies in degree, and may be due either to infiltration or simple congestion of the synovial membrane. This complication is not serious, and generally ends in absorption. The thickening of the ligaments and joint-structures results in impairing the motion of the joints or in rendering them preternaturally mobile.

These bony swellings may remain in an indolent condition for a long time, and finally the gummy deposit may be absorbed, or it may soften and be discharged through a sinus. The shaft of the bone may resume its normal size, or it may be rendered much thinner and lighter. Sometimes it is shortened, and in other cases, again, it is slightly longer than normal. The bone may be left in a condition of eburnation, being decidedly thickened.

The process of involution may be slow or quite rapid, and seems to be in proportion to the rapidity of the development of the lesion. In most cases the deformity is not very marked; in some cases of necrosis a less fortunate result is obtained (Fig. 228). The illustration, taken from my paper on the subject, shows deformity and shortening of the index finger,

FIG. 228.



Showing shortening of the index finger from absorption of part of the phalanx and of the metacarpal bone.

so that its extremity scarcely reaches the first phalangeal joint of the middle finger. In this case the greater part of the first phalanx and the distal extremity of the metacarpal bone had been absorbed, and the remnants of the two bones were connected by fibrous tissue. In a similar manner the second phalanx of the ring finger had been reduced to about one-fourth of its original length. After the process of absorption is complete the contiguous bones are always united by a ligamentous band, which serves as a joint. The function of a finger in such a condition is of course greatly impaired, and excessive deformity may result. The manner in which the soft parts adapt themselves to the altered condition is very remarkable, their contraction being of great service in giving steadiness and solidity to the false joints.

In spite of the extent of the osseous lesions pain is either very slight or altogether absent. In no case have the tendons or their sheaths been found implicated. The absorption of the bones is unaccompanied by ulceration of the soft parts.

This affection is one of the late manifestations of syphilis; occurring usually between the fifth and fifteenth years. The average age of its subjects has been about forty years. Exceptionally it appears early, I having seen one case in which it occurred eighteen months after infection.

The early recognition of these two forms of dactylitis is important in order to prevent destruction of tissue and deformity. The subcutaneous variety in its early stage may be mistaken for perinychia, but the absence of acute inflammatory symptoms, especially pain, establishes the diagnosis. Dactylitis of the great toe might be mistaken for gout but for the sub-acute character of the former. When several fingers and toes are attacked, particularly if there is a coincident affection of one of the larger joints, the case may be regarded as one of rheumatoid arthritis; but the latter is essentially a joint affection, and is quite painful; it attacks the metacarpo-phalangeal (and rarely the metatarso-phalangeal) joints more frequently than the phalanges, and generally involves the sheaths of the tendons; sometimes tophi are deposited in the tendons, especially of the flexors, and elsewhere, as in the cartilages of the ear: deformity begins early, and there is a tendency of the fingers to be drawn to the ulnar side of the hand and to be flexed and extended at various angles. Dactylitis syphilitica may be confounded with enchondroma or exostosis, but in each of the latter the swelling is more localized, being limited to a portion of the circumference of the bone.

The **prognosis** depends in a measure upon the period at which the lesion is recognized. When the swelling is developed quickly rapid involution follows the use of energetic treatment. The longer it has persisted the less amenable to treatment it becomes.

The **treatment** is that of late syphilis, a combination of the iodide of potash with a mercurial; locally, mercurial ointment or plaster applied with pressure is beneficial. Sometimes an incision is required in case of the breaking down of gummatous infiltration.

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## CHAPTER LXXX.

### LESIONS OF THE KIDNEYS, LATE GLYCOSURIA, AND DIABETES INSIPIDUS.

KIDNEY DISEASE in late syphilis is of rather uncommon, but not of rare, occurrence. In 9000 autopsies Wagner<sup>1</sup> found 63 cases of syphilis of the kidneys; of these, 8 were cases of acute Bright's disease, 4 of chronic, 7 of granular kidney, 6 of atrophy of one kidney, 35 of amyloid

<sup>1</sup> "Die Constitutionelle Syphilis und die davon abhängigen Nieren Krankheiten," *Deut. Arch. für klin. Med.*, vol. xxviii., 1880, pp. 94 et seq.

degeneration, and 3 of syphiloma or gummata. Bamberger found 49 cases of syphilis of the kidney in 2340 cases of acute and chronic Bright's disease. Wagner follows Beer's<sup>1</sup> division of the pathological changes of the kidneys in syphilis. These are—1. Small circumscribed nodular formations (gummatous tumors) in otherwise normal or differently diseased kidneys; 2. Simple interstitial hyperplasia, mostly irregular, with the formation of cicatrices in otherwise normal kidneys; 3. Diffuse cellular hyperplasia of the interstitial tissues, mostly with degeneration of the vessels and atrophy of the new formation, as well as peculiar parenchymatous changes. These latter were particularly small fatty deposits, lardaceous degeneration being common in this form; 4. Purely parenchymatous changes. According to Wagner and Beer, only the first and third forms are absolutely characteristic of syphilis.

There are no pathognomonic signs or symptoms of tertiary syphilis of the kidneys. The symptoms are emaciation and various forms of dropsy, together with the presence of albumin in the urine.

### Glycosuria and Syphilis.

The question of the relation between syphilis and glycosuria, or diabetes, has of late been much studied, but still there is much to be learned.

Patients suffering from diabetes, who later on contract syphilis, usually present a severe order of primary and secondary manifestations, due to the hybrid morbid condition. In many instances the initial lesion in these subjects is more exuberant and shows decided tendency to ulceration. With the onset of syphilis, which is usually very rapid, diabetes seems to induce a condition of deep cachexia, and as a result the course of the disease is more severe and less amenable to treatment. In these cases mercury should be used very guardedly. In general, the mixed treatment works well toward the end of the first year. Several writers have stated that sugar seems to leave the urine more rapidly in syphilitic than in other patients. This view is entertained by Arnaud,<sup>2</sup> who has studied the subject exhaustively. Several instances are known in which sugar disappeared at the breaking out of specific manifestations, and reappeared on the cessation. In diabetes and syphilis there is frequently observed a fermentation of the sugar in the mouth, which produces severe and rebellious ulcerative lesions. Though this morbid combination tends to induce great deterioration of nutrition, the consoling fact remains that in some syphilitics sugar disappears more permanently than in those uninfected.

That syphilis, therefore, may in some mysterious manner cause diabetes there can no longer be any doubt. So many cases have been reported in which no other pathogenic cause than syphilis could be ascertained that the conclusion is warranted that diabetes may result from the effects of this far-reaching infection, either by its disturbance of the liver and of the blood-making function, or by reason of some change in the fourth ventricle or in its vicinity.

Diabetes may occur within the first few months of infection, within one or several weeks, and it may occur in the tertiary stage.

<sup>1</sup> *Die Eingeweide Syphilis*, Tübingen, 1867.

<sup>2</sup> "De l'Influence réciproque du Diabète sur la Syphilis, et la Syphilis sur le Diabète," *Thèse de Paris*, 1886.



**Diabetes Insipidus.**

In the course of syphilitic disease of the brain, particularly when seated at or near the floor of the fourth ventricle, diabetes or polyuria is sometimes observed. It has no distinguishing characteristics, and its chief symptoms are inordinate thirst and the discharge of large quantities of pale urine of very low specific gravity, in which neither sugar nor albumin is found.

A number of interesting cases are to be found in literature. Lécorché and Talamon<sup>1</sup> have reported the case of a thirty-four-year-old syphilitic man who had been infected fourteen years before, and who for six years had passed nine to ten litres of urine daily. Under treatment the quantity was reduced to five litres.

Sourouktchy<sup>2</sup> has reported the case of a twenty-five-year-old man who, when seven months syphilitic, was affected with great thirst, and passed large quantities of urine free from sugar and albumin. He was promptly cured by the use of mercurial inunctions and of iodide of potassium internally. The reporter of the case thought that there was a syphilitic affection of the ependyma in the floor of the fourth ventricle.

In a case reported by Buttersack,<sup>3</sup> in which the woman suffered from vertigo, neuralgic pains, and pains in the head, and who voided a large amount of characteristic urine, on post-mortem examination chronic descending leptomeningitis, with implication of the trigeminal and spinal nerves, was found.

**CHAPTER LXXXI.****AFFECTIONS OF THE PENIS, OS UTERI, UTERUS, AND VAGINA.**

In somewhat rare cases a diffuse gummatous infiltration occurs in the submucous connective tissue of the glans penis, either in a localized or general form. This new tissue may break down, and as a result we sometimes see deep ulcers, which are indistinguishable from chancreoids in their appearance. In exceptional cases more or less of the glans itself may be the seat of gummatous infiltration.

It is necessary also to remember that relapsing indurations occur rather early and late in syphilis, and that they are found in the glans, prepuce, at the meatus, and in the urethra. (See page 548.)

**NODES IN THE CORPORA CAVERNOSA.**

In some cases small or large nodules, varying in size between that of a pea and a nutmeg, may be found in the meshes of the corpus cavernosum. These tumors are usually round. They can be quite sharply

<sup>1</sup> *La Médecine moderne*, Jan. 26, 1890.

<sup>2</sup> *Vratch*, No. 1, 1891, p. 1.

<sup>3</sup> "Zur Lehre von syphilitische Erkrankungen des Centralnervensystems nebst einigen Bemerkungen über Polyurie und Polydipsie," *Inaug. Dissert.*, Heidelberg, 1886.

defined, and have a moderately firm consistence, and they may even present cartilaginous hardness.

These lesions develop very insidiously, and in speaking of them patients usually say they knew of no trouble until they found the lump in the penis. As a result of these tumors the penis becomes curved when erect in various ways, laterally, upward, and backward and downward. If these swellings of the cavernous bodies are allowed to become chronic, they produce much structural deformity of the penis. They very rarely soften and break down. They are promptly influenced for the better by antisymphilitic treatment.

Infiltrations of the size of a pea or of a hazelnut are somewhat rarely found in the corpus spongiosum, and which may extend to the parts beyond. They run an indolent course, rarely break down, but become sclerotic and produce very dense and intractable urethral strictures.

In this connection it is well to describe a condition of the corpora cavernosa not caused by syphilis, in which hard, firm, laminated masses develop in the superficial portion of the tissues. It is called *chronic circumscribed inflammation of the corpora cavernosa*—a very objectionable name, since there are no inflammatory symptoms observed during the whole course. The process is really a sclerous infiltration of fibrous tissue. This affection is free from pain and progresses slowly, until the patient notices a small lump which is painful on erection of the penis. Upon examination we find a hard, firm plate of tissue, a line or two in thickness, situated in the superficial portion of the corpus cavernosum. Its margins are sharply defined and regular, or they may be uneven, slightly nodulated, and perhaps thickened. The deeper parts seem to be free from disease. The induration of the plate is variable, in some cases being cartilaginous.

#### EXULCERATIVE HYPERTROPHY OF THE NECK OF THE UTERUS.

Our knowledge of this affection is derived chiefly from the writings of Aimé Martin, De Fourcauld,<sup>1</sup> Mesnard, Doléris, and Blanc. It consists in a total or partial enlargement and hardening of the os, which appears congested and is more or less superficially ulcerated; its surface is granular or often presents a varnished aspect. The hypertrophy is greatest in the transverse diameter, and is but slight in the antero-posterior. The parts are indurated and resistant, or sometimes doughy, and generally are not sensitive to manipulation. In most of the cases there were no symptoms referable to the utero-ovarian system; in others the patients complained merely of certain unpleasant sensations, such as pain in the loins, back, and thighs, and a bearing-down feeling. The secretion from the ulcer is scanty and muco-purulent, and is infectious like the secretion from other secondary lesions. The affection may be accompanied by various displacements of the womb.

According to A. Martin, this lesion occurs in 48 per cent. of syphilitic women, beginning on an average in fifty-eight days after infection, while in reported cases it was developed in the second, eighth, and ninth years of syphilis. According to Martin, it is frequently preceded by fever, and in 31 cases out of 47 it coexisted with hypertrophy of the tonsils. It runs

<sup>1</sup> *Thèse de Paris*, 1877.

a chronic course, but yields readily to internal treatment alone. Martin, who observed its cure in from four to five weeks, considers local treatment of merely secondary importance.

Mesnard<sup>1</sup> reports the case of a woman in whom abortion occurred at the end of the second month of pregnancy, and who was then found to be syphilitic. In eighteen months she again became pregnant, and at delivery a number of hard nodules were found around the os uteri which so impeded dilatation that it was necessary to make four incisions.

An essay from the standpoint of the gynecologist as to the effect of syphilitic stenosis of the os uteri has been published by Doléris.<sup>2</sup>

Mesnard,<sup>3</sup> in microscopical studies of rigidity of the os uteri due to syphilis, found that the process consists in the development of a dense, compact fibrous-tissue infiltration, together with lymphoid cells. It is, therefore, a chronic inflammation of the cellular tissue with chronic lymphitis. As the process grows old the new tissue takes the place of the muscular fibres.

Blanc<sup>4</sup> has reported a case in which dystocia was due to stenosis which followed the initial lesion. He thinks that deep incisions are necessary in such cases.

#### AFFECTIONS OF THE OVARIES, FALLOPIAN TUBES, UTERUS, AND VAGINA.

Syphilitic affections of the ovaries are rarely met with. According to Lancereaux, they present a close analogy to syphilitic affections of the testicle, and are either diffuse or circumscribed. This author has only met with the diffuse form after it has arrived at the stage of atrophy; the ovaries were of the usual size or smaller than natural, fibrous in their structure, with scattered cicatrices, and destitute of Graafian vesicles, although the patients had not yet arrived at the usual age for the cessation of the menses. Lancereaux gives a representation of a case furnished by Dr. Richet, in which there was a circumscribed deposit of gummy material, similar to that found in syphilitic orchitis.

The **symptoms** of these affections are said to be a slight, dull pain in the region of the ovaries, possibly at the outset some increase in the size of these organs, perceptible on abdominal and vaginal palpation, a loss of sexual passion, and sterility. It is evident that these signs, taken in connection with the history of the case, can only furnish a probability of the nature of the disease, which may be further increased by the success of antisymphilitic treatment.

No instance is known in which the Fallopian tubes have been affected with syphilis.

Certain cases in which uterine tumors in syphilitic subjects have yielded to the internal administration of iodide of potassium and mercurials render it probable that this organ is not exempt from the late manifestations of syphilis, but nothing more definite is known upon the subject, since post-mortem investigation has been wanting. The vagina is in rare cases the seat of localized gummatous infiltration.

<sup>1</sup> *Arch. de Tocologie, etc.*, Jan., 1891, p. 19.

<sup>2</sup> "Étude sur la Rigidité du Col d'Origine syphilitique," *ibid.*, vol. xii., April, 1885, pp. 305 et seq.

<sup>3</sup> *Thèse de Paris*, 1884.

<sup>4</sup> *Lyon médical*, March 29, 1891, p. 440.



## CHAPTER LXXXII.

## AFFECTIONS OF THE EPIDIDYMISS AND TESTIS.

LIKE all organs and structures rich in connective tissue, the testicle and its appendages are frequently attacked both early and late in the course of syphilis.

## THE EPIDIDYMISS.

In somewhat rare cases the epididymis is the seat of an irritative process at the date of the general manifestations. Sometimes one and then again both, may be very slightly enlarged, sensitive, and even mildly painful. This ephemeral condition promptly yields to treatment. It may occur in patients who have suffered from gonorrhœa and its epididymitis, and in those who have never been thus affected.

In some cases syphilitic epididymitis begins insidiously, and is not recognized until "a lump" is felt by the patient; in others a slight uneasiness attends its formation. Upon examination we find a small, round, or oval tumor just above the testis, the scrotum itself being unaffected. It usually has a smooth surface and is of a decidedly firm consistency. Its size varies from that of a pea to a lima bean. It may exist in one epididymis only, but frequently both are affected. Such tumors remain in an indolent condition without showing any tendency to degeneration, and they always promptly disappear under mercurial treatment. Other portions of the epididymis or the testicle itself are commonly not attacked simultaneously. I have, however, seen two instances, and Fournier has met with such, in which the globus minor was involved shortly after the globus major. I have also found similar tumors developed in the vas deferens subsequent to the appearance in the epididymis, and others again in which sarcocele coexisted.

This affection is usually a somewhat precocious manifestation of syphilis, occurring in most cases within the first six months, and sometimes as early as the second month, or, again, as late as the fifth year, after infection. It is more commonly unilateral when it occurs at a later period. In opposition to the view that it is the result of acute or chronic urethral inflammation, it is only necessary to say that it occurs in syphilitic subjects, some of whom have never had any urethral trouble, and that it is quickly cured by antisiphilitic treatment. An important point in the diagnosis of this affection is that, as a rule, it attacks the globus major, whereas in gonorrhœal epididymitis the globus minor is most commonly involved alone.

Late in the secondary and in the tertiary stages the epididymis may be attacked. The resulting affection is of slow and usually painless growth, and, as a rule, patients are ignorant of the presence of any testicular trouble until they discover a lump on the organ. The epididymis, in part or in whole, is then found to be swollen and hard, and perhaps a little sensitive on pressure.

No sharply-drawn description can be given of the condition of the epididymis when the seat of change in tertiary syphilis. This appendage may be quite uniformly and evenly swollen, and it may be the seat of bulbous expansions, and it may be slightly, even markedly, nodular. In uncomplicated cases, particularly if seen quite early, more or less prompt resolution of the hyperplasia may follow on active internal and local treatment. When seen late treatment has a limited effect, for the reason that dense fibrous tissue or caseated gummatous tissue has been produced, and much disorganization has resulted. In general, even after what may be called good results have been produced, more or less firmness and rigidity of the parts is left.

**Diagnosis.**—The early form of epididymitis is generally easy of recognition, since it usually coexists with or rapidly follows general manifestations. In many cases a clear history of syphilis is readily obtained.

In the later syphilitic epididymitis it is often very difficult to arrive at a satisfactory diagnosis. In a given case we must bear in mind that an antecedent inflammation, caused by gonorrhœa or some other infectious disease, may have been the underlying cause of the swelling. In cases of chronic posterior urethritis it is not at all uncommon to find a chronic fibroid epididymitis, which may develop acutely and then run a chronic and nearly painless course, or it may begin insidiously and run on in a sluggish manner, or there may be exacerbations of acuity. When in these cases a history of syphilis is also obtainable, it is often impossible to determine whether that diathesis has any influence upon the morbid process.

Chronic epididymitis may result from trauma, but usually a clear history may be obtained.

In many cases of late syphilitic epididymitis, there is a symbiosis with tuberculosis, and in this case it is utterly impossible to make a sharply-drawn diagnosis. The physical signs are sometimes very similar and even identical, and our reliance is then to be placed on the results which follow active local and general antisyphilitic treatment. Syphilitic conditions are thereby more or less benefited, while in tuberculosis at the best only a moderate improvement may sometimes follow the use of the iodide of potassium. On this subject C. W. Allen<sup>1</sup> has published an interesting clinical essay.

It is always well in cases of chronic epididymitis, even if nodulation is present, not to jump too hastily to the conclusion that tuberculosis is the cause, which now-a-days is so frequently done. The surgeon should bear in mind, in considering these cases, chronic posterior urethritis, trauma, antecedent infectious processes, syphilis, tuberculosis, and the tuberculo-syphilitic symbiosis.

In some cases of early and late syphilitic epididymitis the juxta-testicular part of the vas deferens is the seat of irritative, hyperplastic, or gummatous changes.

#### THE TESTIS.

In tertiary syphilis the body of the testis and the tunica vaginalis may be attacked by chronic hyperplastic processes peculiar to that period. In

<sup>1</sup> *American Journ. Med. Sciences*, April, 1894.

general, the body of the testis is alone attacked, and exceptionally there is coincident involvement of its serous tunic.

Tertiary lesions of the testis begin in a painless and insidious manner, without any of the ordinary signs of inflammation. Some patients complain of an uneasy sensation in the organ, but, as a general rule, no attention is paid to the progressing affection until the weight of the swelling produces a moderate pain in the loins and the inguinal region. When seen early, a case of syphilitic orchitis or sarcocele presents no very well-marked features. The organ is found to be uniformly swollen, and quite hard and firm in consistence, and it is less sensitive than in a normal state. In some cases a small portion of the apparent swelling is dependent upon hydrocele, since in nearly every instance of syphilitic orchitis there is a slight effusion into the tunica vaginalis. When the amount of fluid is considerable, it may be necessary to evacuate it by puncture before a satisfactory examination can be made; but in most cases we may by firm pressure sufficiently displace the fluid to reach the body of the testicle and determine its condition by palpation. At an early stage of the disease the testicle may in a minority of cases be found to contain one or more distinct masses of induration, which form slight projections upon the surface of the size of the head of a pin, pea, or even an almond, but which are never so prominent as to change the general contour of the organ. These projections are due to an effusion of plastic material, of the same nature as gummy tumors, upon the surface of the tunica albuginea. As the disease progresses the distinct masses of induration coalesce and form a hard, resistant tumor, which still preserves to a great extent the normal shape of the testicle.

As a rule, the tumor is smooth throughout its whole course, while the other symptoms remain the same.

Testicular tumors of late syphilis may be of the size of a small egg or even as large as a fist. They are ovoid or globular, smooth, firm usually as a billiard-ball, and when elevated in the palm of the hand they feel very heavy. As a rule, no pain is present, and much pressure can be borne without discomfort to the patient.

In somewhat rare cases, particularly when the gummatous infiltration is localized in nodules and masses, the morbid tissue may break down and an abscess-cavity is left. In rare cases this leads to the excessive proliferation of the tissues, and a fungus of the testicle is produced.

The **course** of this affection is exceedingly slow and chronic, frequently lasting for several years. The sexual desires are not changed unless the disease has made great progress in both testicles.

When recognized at a sufficiently early period, syphilitic orchitis may almost invariably be arrested and the organ restored to its original integrity. If left to itself, it most frequently terminates in obliteration of the seminiferous tubes and complete or partial atrophy corresponding to the extent of the adventitious deposit; or, again, the parenchyma of the gland may degenerate into fibrous, cartilaginous, or even osseous tissue.

The pathological changes in tertiary syphilitic orchitis consist of interstitial sclerosis, gummatous infiltration, and sclero-gummatous degenerations.<sup>1</sup>

<sup>1</sup> For the pathology of syphilis of the testicles and epididymis the reader is referred to Monod and Terrillon, *op. cit.*, pp. 429 et seq., and to Reclus, *De la Syphilis du Testicule*, Paris, 1882.



**Diagnosis.**—The smooth, hard, and heavy syphilitic orchitis is generally easily recognized. In a given case it is well to bear in mind that a very firm hydrocele tumor with thick walls may be mistaken for syphilis, and that cystic sarcoma, villous cancer, and carcinoma, and exceptionally tuberculosis of the testis, may exist in the shape of smooth, round, ovoid, and pear-shaped swellings, which, at the period of development and before degenerative changes have taken place, may in every particular resemble the syphilitic testicle.

Localized nodular gummatous infiltration may be mistaken for tuberculosis. In many cases of syphilis no history can be obtained, and in cases of malignant disease it also may be absent. It is well, therefore, in all cases of chronically enlarged testis where the history is doubtful, to cause the patient to undergo a carefully watched but sufficiently vigorous local and general antisyphilitic treatment. If syphilis exists, more or less improvement will soon be noted, and in most cases a brilliant cure will be obtained. When, after a thorough tentative antisyphilitic treatment, the testicular swelling remains uninfluenced or increases in size, the surgeon may quite confidently conclude that the case is one of malignant disease or of tuberculosis. In malignant disease there is no enlargement of the inguinal ganglia until the process has extended to the scrotum, and in late syphilis the condition is similar. In many cases of syphilitic sarcocele there is no evidence of ill-health, which will generally be noted in the other classes of cases just mentioned.

We have no precise knowledge of the effects of syphilis upon the prostate, seminal vesicles, and the bladder.

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## CHAPTER LXXXIII.

### AFFECTIONS OF THE NERVOUS SYSTEM.

So minute and extensive is our present knowledge of the anatomy and structure of the cerebro-spinal system, and so much detail and elaboration has been expended upon the infinitude of morbid conditions of these parts due to syphilis, that for their description a portly volume would be required. It is only intended here to present such a succinct account of nervous phenomena as is required in general practice.

Syphilitic nervous affections may be developed as early as the sixth month and as late as the twentieth year after infection. They are seen more frequently in men than in women, and are most common between the ages of twenty and thirty, simply because syphilis is most likely to be contracted at this period of life. It seems to be an established fact that nervous phenomena are likely to follow a course of syphilis in which the external manifestations have been insignificant or so slight as to have been entirely overlooked.

Syphilis does not primarily attack nervous tissue, but begins in the

vessels and connective tissues of these structures. The brain is more frequently attacked than the spinal cord. Our knowledge of the effect of syphilis upon the cerebellum is as yet rather limited.

The prominence and constancy of some of the nervous phenomena of syphilis enable us to recognize them as distinct affections—namely, subacute meningitis, hemiplegia, epilepsy, paraplegia, and aphasia, and certain others of minor importance.

### **Predisposing Causes of Syphilis of the Nervous System.**

Nervous symptoms are especially likely to appear in persons of a neurotic or neuropathic constitution, which may be hereditary or acquired. Chorea, migraine, apoplexy, melancholia, and neuralgia are common features in the family history of such individuals. Those who have previously had some simple nervous affection are particularly liable, when infected by syphilis, to the development of specific nervous symptoms. Protracted mental anxiety, depressing emotions, sexual excesses, the abuse of alcohol and of narcotics, have been known to act as predisposing causes. Of diseases, those accompanied or followed by cerebral congestion, also malaria and other conditions producing cachexia, may act indirectly. Sunstroke and injuries of the skull may be included, as well as the gouty diathesis, particularly in elderly persons and in those in whom gouty cerebral symptoms have been prominent.

The inadequacy or the absence of treatment in relation to the invasion of the nerve-centres by syphilis should be observed. In reading the histories of cases thus far reported it is found that in many no treatment at all had been attempted, in some the treatment had been insufficient, while in very few had it been carried to the extent which we deem necessary in even the slightest cases.

The nervous phenomena of syphilis generally originate in lesions developed in one or more of the following structures: the cranial bones and vertebræ, the dura mater, the arachnoid and pia mater, the brain and cord, and the arteries, the nerves.

#### **THE BONES.**

Any lesion seated on the inner surface of the cranium or vertebræ may excite inflammation of the membranes, and may finally lead to morbid changes in the brain itself and in the spinal cord. The most frequent lesions are nodes, exostoses, caries, and necrosis.

Although nodes may occur early in the course of syphilis, these are generally considered tertiary lesions. In one instance I have seen multiple nodes developed on the external surface of the cranium ten months after syphilitic infection; the presumption is that similar growths may appear as early on the inner surface. We may, therefore, expect grave disturbance of the nervous system during the first year and as late as the twentieth, since syphilitic osseous lesions are known to be developed even at this advanced period. The phenomena may be referred to pressure or to inflammation of the brain-substance, and are of the most varied character, including paralyses, convulsions, ataxic symptoms, and mental disturbances. Many cases have been observed, in which extensive de-

struction of the skull-bones has occurred, even with partial loss of the dura mater, without the production of cerebral symptoms.

A remarkable case reported by Gama, in which there was destruction of the bones of the face, including the ethmoid, caries of the frontal bone, erosion of the dura mater, disorganization of the arachnoid, and localized superficial softening of the anterior hemispheres, which were bathed in pus, presented as the single nervous symptom severe pain in the head.

It is interesting to notice that large portions of the cerebral mass in the anterior basal region, which was the part involved in the foregoing case, have been removed in surgical operations for injury without producing any bad symptoms.

The membranes of the brain may be the seat of hyperæmia, which produces no permanent alteration, or the process may become chronic and result in structural changes.

#### THE DURA MATER.

The dura mater, being a fibrous membrane, is peculiarly susceptible to the syphilitic influence. The changes, which usually consist of thickening due to increased cell-growth, roughening of the inner surface of the membrane, and abnormal vascularity, are generally not striking. In some cases the membrane has a brownish-red color and gelatinous appearance, yet its structure remains firm.

The extent of the structure involved and the amount of thickening vary, but are generally considerable.

The dura mater may be exclusively affected, or the disease may invade the inner table of the skull and the arachnoid, or the dura mater may be secondarily affected by processes beginning in the arachnoid and pia mater. In the case of nodes of the inner table the dura mater is found thickened and abnormally adherent.

The syphiloma may form a circumscribed tumor or may be diffused over a large area.

In his atlas Lancereaux<sup>1</sup> gives an excellent illustration of gummatous infiltration into the dura mater.

The portion of the membranes enveloping the brain is more often involved than that covering other parts. There may be but one focus of disease or several; in the latter case they are, as a rule, unsymmetrical.

Syphilomata of the spinal dura mater have an origin and pursue a course similar to those of the cerebral.

#### THE ARACHNOID AND PIA MATER.

In simple hyperæmia of the pia mater the arachnoid may not be involved, but when the process advances to cell-proliferation it is impossible to demonstrate a line of demarcation between the two membranes.

In most cases the affection of these membranes consists of congestion and visible enlargement of the vessels, followed by increase of connective tissue and consequent thickening; but sometimes gummatous infiltration supervenes, constituting a gummous meningitis.

<sup>1</sup> *Atlas d'Anatomie pathologique*, pl. 41, Paris, 1874.



More or less change in the subjacent nervous tissue always follows, and the lesion may involve the dura mater and the cranial bones.

This is perhaps the most frequent syphilitic nervous lesion. It is found in single or multiple patches, distinctly circumscribed, of round or oval shape and of various sizes.

When multiple, the patches are scattered irregularly, most frequently at the base, in the anterior and middle fossæ, less frequently on the convexity of the brain, seldom on the cord and medulla, and exceptionally on the cerebellum.

#### THE BRAIN AND CORD.

The changes in the brain and cord are always secondary to lesions of the bones, of the meninges, or of the vessels, and consist of two kinds of softening, the red and the white, which are similar to these lesions when non-specific.

The softening is likely to be more superficial when the lesion begins in the meninges than when it originates in the bones.

A primary vascular lesion on the basal surface will produce much more serious and extensive structural change in the brain than one at the vortex, for the reason that in the latter situation the vessels anastomose freely, whereas in the former each vessel is distributed to a region which has no other source of nutrition.

#### THE ARTERIES.

Although the effect of syphilis upon the cerebral arteries has been referred to by several English authors, our knowledge of the subject was meagre and unsatisfactory until the appearance of the excellent monograph by Heubner, in which he gives a minute description of the various morbid changes.

These changes, which are chiefly subendothelial, consist of thickening of the lamellæ of the endothelium, between which and the membrana fenestrata is soon deposited a finely granular substance, with a few nuclei, some in process of division, as well as a few nucleated spindle-shaped and stellate cells. In the normal condition this part is nearly free from cells and nuclei.

Subdivision and fresh proliferation of cells constitute the subsequent changes. An important point of distinction between atheroma and the syphilitic process is that in the latter the development of cells is more active than that of intercellular substance.

As the process continues the endothelium becomes separated from the membrana fenestrata; the interposed cells become compressed and flattened, and by their fusion probably result in the formation of giant-cells. The endothelium becomes thickened and encroaches on the lumen of the vessel. Owing to the irritation produced, small round cells, perhaps derived from the vasa vasorum, are observed. While the essential lesion is limited to the locality mentioned, adjacent parts may become secondarily involved, and these small round cells may be seen in the meshes of the tunica media and tunica adventitia. The new growth gradually becomes organized, and is supplied with nutrition by newly-formed capillaries, most clearly seen in a transverse section.

The subsequent morbid process is a subdivision into layers of the new tissue between the *membrana fenestrata* and the endothelium. At the same time a new *membrana fenestrata* is formed beneath the endothelium, which is regarded by Heubner not as an essential part of the syphilitic process, but as due to increased activity of the endothelium. -

In the early stage of this lesion very slight impediment to the blood-current results, but as contraction of the lumen of the artery goes on white blood-corpuscles are deposited along its inner wall until a perfect thrombus may be formed. Occasionally the vessel still remains slightly permeable.

There are several points of distinction between atheroma and this syphilitic lesion. The latter is much more rapid in its course, and usually occurs much earlier in life. In atheroma the calibre of the vessel is seldom diminished, while in syphilitic endarteritis complete stenosis may result. Atheroma generally involves more extensive surfaces and a larger number of vessels than the syphilitic lesion, and, moreover, in the latter there is no tendency to calcific degeneration, so common in atheroma, which, unlike the product of the syphilitic process, is incurable.

This process is not at all specific in its nature, since the cells are similar in structure and arrangement to those of certain sarcomata and gliomata. The syphilitic virus seems to excite irritation of the endothelium, which results in the conditions previously described. The resemblance of this lesion to gummata or granulation tissue is very marked. I have observed an instance in which it existed in the left Sylvian artery, continuous with a gumma completely encircling that vessel.

Although this arterial lesion may occur as early as the first year of syphilis, it is usually developed much later, having generally been found associated with nodes and gummata of the liver and testes. As a rule, it is to be expected at about the third year of syphilis, but may occur as late as the twentieth.

The arteries most frequently involved are the large vessels at the base of the brain, and, for reasons already given, the danger to an extensive portion of the cerebral mass from defective nutrition is much greater than in disease of arteries distributed to the convexity.

The morbid change is rarely confined to a segment of the artery, but usually involves its entire circumference, and generally from an inch to an inch and a half of its continuity. Several vessels may be involved in different stages of the lesion or only one may be affected.

In advanced stages of the morbid process the vessel is found to be thickened, rigid, and slightly compressible, and may even have a nodulated appearance, due to excessive cellular development and invasion of the outer tunics at certain points. A thickened artery of small size may present several rounded expansions within the limit of an inch.

Longitudinal sections of an artery which is affected to an extreme degree shows roughening of its inner surface, which has lost its normal gloss and color, being dull gray where the lesion is recent and brownish where it is older.

Thrombi, with or without distinct laminae, are found, some very thin and friable, others firm and fully occluding the vessel.

Friedländer and Köster believe that the cellular infiltration of the tunica intima, and, in proportion to the intensity of the process, of the other coats of the artery, is not peculiar to syphilis, but is found in inflammatory, tubercular, carcinomatous, and other growths. They compare the process to that of organization of a thrombus, and conclude that the new cells of the intima are derived from the vasa vasorum.

While Heubner admits that the cellular infiltration of the outer coat is derived from the vasa vasorum, he is positive in his opinion that the cells found in the inner coat are furnished by proliferation of the epithelial lining of the vessel due to irritation by the syphilitic poison. He thinks that it is a gummatous affection beginning in the intima, independently of inflammatory processes without the vessel.

Baumgarten of Königsberg has studied the subject carefully, and, though agreeing in the main with the former observers, he thinks that Heubner is right in his belief that the infiltrating cells have two sources. The growth in the outer coats he considers gummatous and peculiar to syphilis, while that in the inner coat he thinks is non-specific; in other words, the cells from the vasa vasorum form a gumma, while those derived from the endothelium form a tissue resembling ordinary granulation tissue.

In the thesis of Rabot another variety of syphilitic arteritis is described on the authority of M. Charcot, who calls it "syphilitic periarteritis." The details are given of an autopsy made upon a syphilitic woman, thirty years of age, at which, among other lesions, was found upon the trunk of the left Sylvian artery, near its origin, a nodosity as large as a haricot bean, whitish in color, irregular in form, and appearing to involve the external tunics of the vessel. Similar lesions were found on other arteries, but they were much more numerous on those of the base than on those of the convexity. Microscopic examination of these tumors showed that they were the result of an acute arteritis, producing thickening of the internal coat, with infiltration of connective-tissue cells into the tunica media. The new tissue consisted of fusiform cells in the midst of a finely granular fibrillated substance. The internal elastic tunic was intact, while the tunica muscularis was infiltrated with round embryonic cells and permeated by capillaries. Similar young cells were found throughout the external coat, chiefly around the vasa vasorum, which were much enlarged. Contraction of their walls and the formation of thrombi had produced occlusion of the vessels.

Charcot leans to the opinion that this is a true syphilitic periarteritis, but refrains from a positive statement until he has made further observations.

#### THE NERVES.

The *cerebro-spinal* nerves may be involved in the various affections of the meninges; they may be encircled by gummy tumors or they may be compressed by swellings of the bony foramina. The resulting symptoms are anæsthesia, hyperæsthesia, analgesia, neuralgia, paralysis, or disturbances of the special senses.

Syphilitic lesions being most frequent in the neighborhood of the interpeduncular space, the nerves near this lesion are most commonly involved.



The third pair are perhaps most often affected, the first, second, fourth, and sixth quite frequently, while syphilitic changes of the seventh pair, or facial nerves, are rather exceptional.

The syphilitic lesions of the optic nerve have been studied by Barbar, Arcoleo, and Hulke, but more recently by Schott, who describes them very accurately and illustrates them copiously with lithographic plates. This observer confirms the view of Virchow, that there may be both neuritis and perineuritis. In two cases he found free proliferation of young, round, nucleated cells in the connective-tissue sheath, with some increase of the spindle-shaped cells. He found similar cells, in rows and solitary, in the nerve-tissue itself and around the nutrient vessels of the nerves. The nerve-bundles were separated and thinned by the pressure. In one case the process was limited to a portion of one optic nerve, and was more pronounced near its origin. In the other case, though both nerves were involved, the left was more markedly affected.

Other cranial nerves and the spinal nerves may be altered in a similar manner, with or without coincident lesions of adjacent parts. Heubner states that a nerve has been found to pass through a syphilitic new growth and yet remain normal.

We know, as yet, little of the morbid changes caused by syphilis in the peripheral nerves, but certain clinical facts indicate that neuritis and multiple neuritis occur in the course of syphilis, as they do in that of other infectious diseases. A number of writers describe the gross appearances as follows: In the early stage they lose their rounded shape and become swollen; they assume a reddish-yellow color and a soft and pulpy consistency; at the same time the swelling may give them a bulbous appearance; subsequently they become atrophied into yellowish-white cartilaginous cords. This, like all other syphilitic lesions, is limited to certain portions, and never attacks the entire length of a nerve. We are wholly ignorant of any primary changes in the nerve-fibres and axis-cylinder.

The *sympathetic* nerves may undergo two varieties of changes—one affecting the nerve-cells and characterized by pigmentary and colloid degeneration; the other consisting of a connective-tissue proliferation. These conditions were found by Dr. Petrow, on microscopic examination both of fresh specimens and of those hardened in chromic acid, in the cervical, thoracic, and solar plexuses of syphilitic subjects. He draws the following conclusions from his studies: The syphilitic diathesis affects the sympathetic nerves, determining very distinct alterations. The nerve-cells may undergo change independently of the connective tissue, consisting of pigmentary and, less frequently, of colloid degeneration. The connective tissue may undergo, as elsewhere, sclerosis and cause atrophy of the nervous elements. The membrane covering the nerve-cells may be involved, at first by hypertrophy from cell-infiltration, which may afterward undergo fatty degeneration.

### Syphilitic Tumors of the Nervous System.

Two forms of syphiloma, or syphilitic tumor, are found in the cranio-vertebral cavity which differ widely in gross appearances, but are composed of similar structural elements. These tumors are usually connected

with the cerebrum; they have rarely been found in the medulla oblongata or in the cord, and we are not aware of any having been observed either upon or within the cerebellum.

The first form is of a grayish-red color and is extremely vascular, most of the vessels being very minute, while some are plainly visible to the naked eye. When developed exclusively in the pia mater and arachnoid the tumor is soft and slightly fibrous; but if it is formed only in the dura mater, its consistence is quite firm, owing to the abundance of fibrous tissue.

Under high powers of the microscope the tumor is found to consist of small round cells, arranged regularly or without order in a very delicate alveolar stroma of connective tissue. The walls of the newly-formed vessels are usually much thickened by cell-increase.

The second form of tumor, which is harder and of a yellowish color, is merely a late and degenerating stage of the first variety. Excess of fibrous tissue renders its structure more dense and its boundaries more clearly defined. The blood-vessels are few, and, while permeable at the periphery, at the centre of the tumor they are converted into fibrous cords. On section the tumor is slightly resistant to the knife and appears more or less desiccated. Microscopic examination shows a distinctly fibrous stroma, in which is imbedded a large quantity of withered cells, granular and fatty matter, and blood-crystals.

These tumors vary greatly in number and in size; there may be a single one or the surface of the hemisphere may be studded with large numbers of them, resembling the condition in miliary tuberculosis; they may be of the size of a pea or of a small walnut. They are usually round or oval, but in some situations they become flattened. They have been found encircling an artery, and it is probable that their origin is always around some vessel, particularly one traversing the large fissure of the brain. In rare instances the soft form of tumor has been found in large patches, involving chiefly the vascular cerebral membranes, and having a thickness of from a quarter to half an inch, and constituting in reality a gummatous meningitis.

These tumors are found chiefly on the inferior surface of the brain, in the region of the fissure of Sylvius. Great care must be employed in examining the hemispheres, since such growths may exist in any recess of the brain into which the vascular membranes are reflected. Heubner says that frequently, after having, as he supposed, finished an autopsy, he has run across minute tumors hidden in such situations.

### Hemiplegia.

One of the most frequent phenomena of cerebral syphilis is hemiplegia, which may occur as early as the third month or as late as twenty years after infection. The interference with the motor function may be slight or there may be complete loss of power. It is generally preceded by a stage in which a prominent symptom is localized headache, often associated with many of the other symptoms already mentioned, such as mental disturbance, hebetude, vertigo, and convulsions, which are often immediately followed by the paralytic stroke.

In some cases muscular spasm, a form of preparalytic chorea, has been

observed in the limbs afterward paralyzed. For instance, the arm may be jerked in various directions, or the patient may find it impossible to place the foot firmly on the ground, the leg being pulled suddenly from under him when he attempts to stand. In other cases darting pains are felt in the leg or arm, or constant neuralgic pain may exist in some part of the limb, or there may be numbness or tingling in the hands and feet, with patches of hyperæsthesia or anæsthesia.

In cases of gradual invasion total paralysis seldom occurs. The patient first notices that he is losing strength, perhaps in his fingers, so that he finds himself unable to button his clothing or to hold a pen firmly. This condition may continue until paralysis comes on, or it may be intermittent, the normal strength returning at intervals. When the leg is thus affected the patient naturally has more or less difficulty in walking. Complete hemiplegia has been seen to come on in this gradual manner, but is generally sudden. Sometimes the leg is affected several hours before power is lost in the arm. The reverse, however, is infrequent. Patients are usually attacked with hemiplegia when engaged in some act of muscular effort, such as pulling on the boots, walking briskly, reaching for some object, or on the point of shooting at game. On the contrary, the attack may happen during the night, and the patient be unable to rise from the bed in the morning.

The **course** and **duration** of hemiplegia vary greatly. When partial the paralysis may gradually improve, and even disappear spontaneously in a few days; or, as improvement takes place, the opposite side may be similarly affected, followed by recurrence of the paralysis on the side first involved. These cases are accompanied by excessive mental impairment, and, as a rule, have an early fatal termination. Syphilitic hemiplegia is caused by lesions of the arteries, and in cases of the latter class just mentioned the vessels of each side of the brain are implicated.

Disturbance of general sensation is usually limited, but instances of slight loss of motor power, with complete loss of the sensory function, have been reported. In exceptional cases there may be total loss of both motion and sensation.

A great variety of phenomena, depending upon the extent and situation of the lesions, may accompany syphilitic hemiplegia, such as paralysis of various nerves, aphasia, mydriasis, optic neuritis, and epilepsy. Mental depression seems to be constant, and most patients either display a condition of complete hebetude or are excessively emotional.

Early and energetic treatment may accomplish the relief and even the cure of hemiplegia, but the **prognosis** is greatly influenced by the age and extent of the lesion. The arteries arising from the circle of Willis supply the most important regions of the brain, and are most frequently affected by syphilis; obviously, if but one is involved the prognosis may be more favorable than if many are. The number and gravity of the symptoms will usually give an idea of the extent of the lesion. In a simple case of hemiplegia probably only one or two vessels are affected, and complete recovery may take place, but when other symptoms, indicative of extensive disorganization of the brain, are exhibited, the prognosis must be less favorable. As a rule, perfect health is in no case restored, although the patient may present no conspicuous abnormality.



We may say, however, that the prognosis in syphilitic hemiplegia is better than in the simple form.

**Diagnosis.**—Syphilitic hemiplegia usually occurs much earlier in life than the simple variety, which is not commonly seen before the age of forty years. In diagnosis, therefore, it should be remembered that syphilis is the cause of most of the cases of hemiplegia in the young and middle-aged. The fact that a patient rarely loses consciousness when attacked by syphilitic hemiplegia is an additional diagnostic point of importance.

### Epilepsy.

This is of frequent occurrence in cerebral syphilis, and, like non-specific epilepsy, presents two forms, the *grand mal* and the *petit mal*. Headache, increasing in severity, always precedes an attack. The symptoms of the severe form are similar to those of the non-specific variety, consisting of sudden loss of consciousness, tonic followed by clonic spasms, facial distortion, foaming at the mouth, and stertorous respiration. According to some authors, the epileptic aura and cry are absent. Such convulsions generally occur at short intervals, and frequently, with distinct regularity, every ten days or once a month. Instances of their regular occurrence in the evening and at night have been reported, but, as a rule, they come on at no definite time. In some cases consciousness returns in a few minutes; in others the patient remains in a stupid condition for hours, and may not be fully restored for several days. After the seizure the headache may be much less severe for a time, but unless treatment is followed its intensity soon returns.

The **course** of syphilitic epilepsy is uncertain, and may be greatly modified by treatment.

When convulsions follow a long prodromal stage in which symptoms of mental disturbance have been particularly severe, the **prognosis** must be rather unfavorable; cases in which they follow a short period of headache generally yield to proper treatment, as we have several times observed. Tonic spasms may precede or follow an attack of hemiplegia, and are often seen in connection with permanent or intermittent aphasia. They are generally caused by pachymeningitis, though probably, in some cases, as claimed by Jackson, irritation from a tumor is the exciting cause.

The intervals of syphilitic epilepsy, unlike those of apparent health in the simple form, are marked by symptoms of mental disturbance, which tend to increase, and may finally end in dementia.

The mild form, called by Charcot partial syphilitic epilepsy, may exist independently or combined with the severe form. The paroxysm may begin either with a twitching of one side of the face, a turning of the tongue to one side, a tendency on the part of the patient to whirl around, extreme giddiness, general trembling, or great weakness, or cramps of the extremities, which are followed by loss of consciousness and a convulsion consisting either of slight muscular tremor or of general tonic spasm. The seizure may be limited to a single limb or to one side of the body, and in some cases amounts to nothing more than slight rigidity. The severity and length of the attack are much less than in the *grand mal*.

Frequently there is no convulsion at all, but the patient, while talking or in performing any act, becomes unconscious and is seen to stare vacantly. If sitting, he becomes motionless; if walking, he does not fall, but proceeds in an uncertain, aimless manner; and if in the midst of conversation, he suddenly becomes obtuse and fails to comprehend any question addressed to him. While in this condition, which may last only a few seconds or even twenty minutes, he may perform rational acts, such as paying properly for a purchased article, or he may even walk along without staggering, and when his senses are restored he may recall indistinctly or not at all what he has said or done.

Dr. Hughlings Jackson has described a form of seizure which he has found to be caused by syphilis, and to be accompanied or followed by optic neuritis. It begins unilaterally as a mere twitch, a slight rigidity, or a violent convulsion, in most cases in the thumb and fore finger. It may be limited to the arm, along which it extends, or it may also involve the face of the same side; it may reach the leg and constitute a hemispasm, or finally it may proceed to general convulsion. During the intervals, which vary in length, a course of symptoms similar to those of the *grand mal*, though perhaps of milder character, may be observed.

The diagnostic points of syphilitic epilepsy are—1, the history of the patient; 2, the paroxysmal headache; 3, the frequency of mental disturbance; 4, the frequent coexistence of optic neuritis, hemiplegia, aphasia, and paralyzes of various nerves; 5, the age of the patient; 6, the result of treatment.

Simple epilepsy is usually developed before puberty, whereas that caused by syphilis generally occurs between the ages of twenty and thirty, the period when syphilis is most frequently contracted. The former is either uninfluenced or aggravated by the iodide of potassium and mercurials, whereas their influence on the latter is favorable and in some cases curative.

### Paraplegia.

Though the spinal cord is attacked by syphilis less frequently than the brain, at least one-half the cases of paraplegia are of syphilitic origin.

The **symptoms** are not strongly marked. The patient, who may or may not suffer from pain in the back, notices slight weakness of the lower extremities, and may also complain of one or more of the following symptoms: Darting pains and spasms in the legs, numbness, tickling, or aching pains in the feet, hyperæsthesia, anæsthesia, dermatalgia, and formication. Loss of co-ordinating power may be observed. There is usually progressive weakness in the expulsive power of the rectum and bladder. This condition may remain stationary for a long time or it may improve temporarily, but unless treatment is adopted complete paralysis of both legs finally ensues. On the other hand, the development of paraplegia may be much more rapid.

General sensation may be preserved slightly impaired or wholly lost. Exceptionally it is destroyed, while the motor function remains perfect. After the establishment of full paralysis there may be short intervals of slightly restored power or there may be jerking of the muscles.

Paraplegia may be the only manifestation of syphilis existing at this time, but frequently there are evidences of lesions in the brain, such as

headache, vertigo, mental impairment, paralysis of one or more cranial nerves, particularly those supplying the muscles of the eyes, or optic neuritis. Mydriasis has also been observed. The presence of any of these latter symptoms confirms the diagnosis of syphilis, which is ordinarily less clear in this than in other nervous affections of specific origin. Careful inquiry into the history and age of the patient is demanded. Simple idiopathic paraplegia generally occurs later in life than the syphilitic form, and the latter, like all specific nervous affections, is greatly influenced and frequently cured by treatment, which should be adopted early in all cases, even in those of doubtful character.

The **prognosis**, unless treatment has been long delayed, is favorable.

The **causes** of syphilitic paraplegia are lesions of the vertebræ, of the spinal meninges, and tumors, which by pressure on the cord lead to myelitis and softening.

Cases thus far observed indicate that paraplegia is a later manifestation of syphilis than hemiplegia and epilepsy, though probably the lesions which cause it may be developed as early as within the first year of syphilis. In the majority of recorded cases its invasion has occurred after the sixth year of infection. It may of course occur very much later.

### Aphasia.

Various disturbances of speech, included under the term "aphasia," frequently occur in the course of syphilis of the nervous system. These may consist merely of hesitation in speaking, called *embarras de parole*, or of inability to remember certain words in writing and in speaking, or of the use of utterly inappropriate words on all occasions.

Van Buren and Keyes have reported an interesting case of a man who, prior to an attack of syphilitic hemiplegia, spoke English and French, besides German, his native language, but during recovery he could only speak French.

Syphilitic aphasia may be continuous or intermittent, and always accompanies other symptoms, which determine its origin, since it presents in itself no diagnostic features.

The **prognosis** depends to a great extent upon the early adoption of antisypilitic treatment.

### Locomotor Ataxia.

Investigations made within fifteen years very clearly show that in 60 or 70 per cent. of cases of locomotor ataxia the patients had suffered more or less remotely from syphilis. This affection is due to connective-tissue increase in the neuroglia, which is so commonly caused by syphilis.

The syphilitic form of this disorder is similar in its clinical history to, and is as rebellious to treatment as, the simple form.

### Chorea.

The spasmodic muscular movements caused by syphilis are irregular and occasional, and never constitute complete chorea. Preparalytic



chorea, characterized by spasmodic contractions without loss of consciousness, preceding an attack of hemiplegia or paraplegia, has been already referred to; similar contractions not infrequently follow these paralyzes, and the condition is then called post-paralytic chorea.

The spasms vary in intensity from a mere twitch to a decided convulsion, and may be limited to an arm, or may at the same time include the face, or they may occur unilaterally in the arm and the leg. They do not, as a rule, become general, and always coexist with other symptoms of graver importance.

### Pseudo-general Paralysis or Dementia.

The relation of syphilis to general paralysis of the insane has been until recently a disputed question. While some authorities claimed that the latter affection was in a measure due to syphilis, others believed that its occurrence in a syphilitic subject was a mere coincidence. The subject has lately been carefully studied by Mickle and Fournier, who have arrived at the conclusion that syphilis produces an affection resembling in certain respects the general paralysis of the insane, but that the two diseases are not identical.

This affection, to which Fournier gives the name *pseudo-general paralysis of syphilitic origin*, consists of an association of intellectual, sensory, and motor disturbances, evidenced by numerous and complex symptoms. The intellectual disorder is indicated by cerebral excitement and exaltation of ideas with incoherence, and by gayness of spirits alternating with hebetude, together with delirium and even mania. The motor disturbances are well marked, and consist of uncertain movements without paralysis, trembling, and imperfect prehensile power of the hands, sudden loss of equilibrium, imperfect co-ordination, staggering gait, and hesitating speech. Besides these, there are frequently special affections, such as trembling of muscles and partial paralysis, ephemeral or persistent, and also certain symptoms of cerebral congestion; of the latter may be mentioned a sense of weight and pain in the head, dizziness, sudden dazzling sensations, vertigo, and various impairments of sight and hearing; to these should be added epileptic and epileptiform convulsions and sudden seizures of an apoplectic character. Of course we never meet with all the above symptoms combined, but in all cases many of them are associated.

The peculiarities of this syphilitic affection are that the paralytic symptoms predominate; that symptoms appear in a capricious and irregular manner, fibrillary contractions of the facial and lingual muscles being absent; that there are no well-defined exalted ideas; and that behind all there is generally a syphilitic cachexia.

After considering the subject exhaustively and criticising the loose manner in which the term "syphilitic insanity" is used, Mickle gives the following points of differential diagnosis between true general paralysis and the pseudo-general paralysis of syphilis:

1. Distinct history or symptoms of syphilis.
2. Preceding cranial pains, nocturnal and intense.
3. Exaltation less marked, less persistent, and perhaps less associated with general maniacal restlessness and excitement.

4. Sometimes complicated by palsies of one or more cranial nerves, or by hemiplegia, paraplegia, etc., having the character and course of syphilitic palsies.

5. The greater frequency of optic neuritis, early amaurosis, deafness, local anæsthesia, vertigo, and local rigid contraction.

6. The affection of the articulation is paralytic rather than paretic, and usually speech is not accompanied by any facial or labial tremors.

7. Cerebral or spinal meningitis or pachymeningitis.

8. Great variety of motor and sensory symptoms, their capricious association or succession, and their transitory character, and the absence of general progressive muscular paresis.

9. Effect of antisyphilitic treatment.

Mickle adds that in the simple affection the faradic contractility of the muscles of the extremities becomes considerably and progressively lessened, while in syphilis it is normal or but slightly impaired. This condition originates in connective-tissue infiltration and in perivascular changes.

### Multiple Neuritis.

Our knowledge of multiple neuritis may be said to have been formulated and systematized within the past five or six years, though of course the observations and studies of many physicians over a long stretch of years laid a good foundation. It is a subject of congratulation that American observers have played no small part in the study of this subject and have aided materially in its partial elaboration. As it stands today, the subject of multiple neuritis is imperfect in the direction of etiology and pathological anatomy, but hopeful signs are to be seen on all sides, and as time goes on anomalous facts will be reconciled and hiati be filled.

In the year 1879, Buzzard<sup>1</sup> published a lecture in which was detailed a case of sciatica with muscular wasting and weakness of the limbs, which that author considered to be caused by syphilis. In 1881, Ormerod<sup>2</sup> presented to the Pathological Society of London a case of painful enlargement of the median nerve of the upper extremity, which he thought was the result of hereditary syphilis. This communication was followed by a second consideration of this subject by Buzzard,<sup>3</sup> who detailed the history of a case in which there was paralysis of the muscles of the face and of both the upper and lower extremities and of the trunk, with disseminated anæsthesia.

The next paper on this subject was by Ehrmann<sup>4</sup> in 1886, and it was followed by a communication by C. K. Mills<sup>5</sup> before the American Neurological Association. Then, in 1888, Laschkewitch<sup>6</sup> published a clinical

<sup>1</sup> "Clinical Lecture on Cases of Neuritis, Syphilitic and Rheumatic," *Lancet*, March 1, 1879.

<sup>2</sup> *British Med. Journal*, 1881, vol. i. p. 88.

<sup>3</sup> "Harveian Lectures on Some Forms of Paralysis dependent upon Peripheral Neuritis," *Lancet*, Nov. 28 and Dec. 1, 1885.

<sup>4</sup> "Ein Fall von halbseitiger Neuritis spinaler Aeste bei recenter Lues," *Wiener med. Blätter*, 1886, Nos. 46 and 47.

<sup>5</sup> "Notes of Some Cases of Multiple Neuritis (or Myelitis) of Syphilitic Origin, with remarks on the difficulty of diagnosing multiple neuritis from some forms of myelitis," *Medical News*, Aug. 20, 1887, and *N. Y. Medical Journal*, July 3, 1887.

<sup>6</sup> "Neuritis multiplex chronicaluetica," *Russ. Med.*, St. Petersburg, 1888, vol. i. pp. 87 to 90.

lecture upon this subject, which is very unsatisfactory, for the reason that the history of syphilis in the case was not well established. In this same year Leyden<sup>1</sup> published two lectures on inflammation of peripheral nerves, in which he speaks of a case in which he thought the nerve affection was caused by syphilis. Finally, in the recent excellent compendium of Bowlby<sup>2</sup> we find a section upon neuritis of syphilitic origin.

An important case of multiple neuritis, with analgesia of the hands and arms, legs and toes, was published by me some years ago.<sup>3</sup>

Two very interesting cases of neuritis of the ulnar nerve have been published by Gaucher and Barbe.<sup>4</sup>

**Treatment.**—It may be well here to emphasize the point that in the treatment of syphilitic nervous affections, particularly those occurring within the early years of the infection, we must not place our whole trust in the iodide of potassium and ignore mercury. This latter agent is sometimes invaluable in these cases. By its use, together with that of the iodide, it will in many cases not be necessary to give the latter drug in such very large doses as we sometimes do. Mercurial-ointment inunctions and hypodermic injections of the bichloride of mercury are in many cases of signal benefit. Iodide of potassium internally and mercury locally applied should not be forgotten in brain, medullary, and neuritic syphilis. It is important in the treatment of cases of cerebral syphilis that the mercurial ointment should be rubbed, if possible, upon the neck or upper portions of the body, in order to act upon the lymphatic system as near as possible to the brain. With care and attention to the local reaction which the inunctions may induce (but not necessarily), the region of the neck, and even the scalp, may be utilized for sufficiently long periods to ensure amelioration of the case.

Not only in cases of syphilitic meningeal lesions, but also in those of arterial degeneration, of extensive and localized paralyses, epilepsy, dementia, and of the various syphilitic neuralgias, will this combination treatment prove beneficial, and very often be followed by the most prompt and brilliant results, as I have so often seen. The regional use of the inunctions is, in my judgment, a great aid in promptness of cure.

(For further information see chapter on the Treatment of Syphilis.)

### Syphilophobia.

*Syphilophobia* is sometimes included among the manifestations of syphilis, but I do not believe that it is directly due to this disease. It is quite as often met with in patients affected only with gleet, prostaticorrhœa, or who have nothing in the world the matter with them except their own disordered imaginations. Moreover, in truly syphilitic cases the fear of syphilis often increases in proportion as the specific symptoms disappear.

Syphilitic patients will sometimes state that they have resolved to

<sup>1</sup> *Die Entzündung der peripheren Nerven, deren Pathologie und Behandlung*, Berlin, 1888, p. 26.

<sup>2</sup> *Injuries and Diseases of Nerves and their Surgical Treatment*, Philadelphia, 1890, pp. 460 et seq.

<sup>3</sup> *New York Med. Journal*, July 5, 1890.

<sup>4</sup> *Annales de Derm. et de Syph.*, p. 26 and p. 310, 1895.



give up their business and devote their time to the cure of their disease. Such a course should always be discouraged, since it favors mental depression, interferes with the general health, and thus retards the effect of remedies, and may lead to confirmed hypochondria or syphilophobia.

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## CHAPTER LXXXIV.

### THE ABORTIVE TREATMENT, AND TREATMENT OF CHANCRES.

#### The Abortive Treatment.

THE idea of preventing syphilis by the destruction of the chancre is a very old one, dating as far back as the end of the fifteenth century. It was brought into prominence by the writings of Bell and Hunter toward the end of the last century. These famous surgeons taught that the chancre was always local, and that general infection did not occur immediately, but that it followed as an accident consecutive to the chancre. In spite of such strong statements, which by implication recommended the excision of chancre as a cure for syphilis, no clinical evidence of its use early in this century is at hand. The era of this prophylactic treatment may be said to begin with the publication of a paper by Hüter<sup>1</sup> in 1867, which, though sadly incomplete in many details, claimed the cure of two cases of syphilis out of seven in which the chancre had been excised. This paper may be said to have led the way to the generalization of excision of chancre as a means of attenuating, emasculating, delaying, suppressing, or aborting syphilis in its early stage. The theory of its action may be briefly stated to be based upon the supposed local character of the initial lesion which was thought to exist for a short time after its appearance. The opposite theory, of the immediate infection of the system, presupposed the entry of the virus through the lymphatic system into the general circulation and its return to the point of infection, where it underwent a slow process of germination, and then again became generalized. This view was not supported by the facts offered by the evolution of syphilis nor by the clinical features of the hard chancre itself; therefore, this theory failing, the doctrine of early localization was quite generally accepted.

The opinions very generally held by advanced students and authorities in syphilis as to what takes place in the early stages of infection may be concisely stated as follows: That the virus is localized at its point of entry, and that the first stage of syphilis, or rather its first period of incubation (which means the interval between the date of the infecting contamination and the appearance of the chancre), is occupied by the processes which go toward the development of the chancre, and that this lesion is then the

<sup>1</sup> "Excision der Ulcus Induratum," *Berl. klin. Wochenschrift*, No. 27, 1867; and "Zur Geschichte der Excision der Ulcus Induratum," *Centralblatt für Chirurgie*, Nos. 23 and 24, 1879.

sole expression of the disease. The virus is then supposed to be limited to the chancre for some time—let us say from one to eight or ten days—and in this period annihilation of the disease is possible. Lang's<sup>1</sup> idea of the chancre is sharply stated, and conveys in a few words the prevailing sentiment of the past twenty years at least. He says that a morbid focus is developed, and at its periphery a cell-wall is formed which acts as a temporary barrier or blockade. In due time (during which the syphilitic virus is germinating and maturing) this melts away or disappears, and then the virus is carried into the surrounding parts by the lymphatics and the blood-vessels and by slow contiguous tissue-infection. In this connection it must be mentioned that the experiment of Cohnheim had much to do with fortifying the view of the local nature of the young chancre. This observer threw into the anterior chamber of the eye of a rabbit, by means of a hypodermic syringe, a small quantity of tuberculous matter. For eight days no change whatever was observed, but after that time liquefaction and absorption took place, and in due time the infection of the whole organism followed. Under these conditions it is not strange that the belief in the prophylactic benefit of excision of chancre is extensively held, though it must be confessed that there are not a few who scouted the idea and claimed syphilis as a constitutional disease from the first.

Hüter's paper, already mentioned, while it marks an era, was not productive of great results in the utilization of this method, and it was not until the appearance of two essays by Auspitz<sup>2</sup> and Unna in 1877 that excision of chancre was extensively tried. These observers reported 33 cases in which chancres were excised, of which in 14 success was claimed, in 10 failure was conceded, and in the balance the records of essential facts were so incomplete that they were thrown out. The results here obtained, fortified by the high reputation of Auspitz, made a decided impression upon the medical world, and from this date excision of chancre was largely practised in Germany, and to a less degree in Italy and France. In America and England syphilographers looked coldly upon the procedure, which, it may appear strange to say, in their hands gave uniformly barren results. Auspitz and Unna's paper was followed by a second one by Auspitz<sup>3</sup> alone, in which he took the ground in an unqualified manner that the initial sclerosis should be looked upon as a symptom local in character. This assertion had certainly the greatest weight in causing the quite general adoption of excision of chancre as a prophylactic for syphilis. It had much to do with clinching in the minds of physicians the impression that at first the syphilitic process is a strictly localized one. The chancre came to be regarded as the concentrated effect of the virus, and that for contamination of the system to occur the changes inherent in it must go on to maturity before its poisonous elements could be scattered generally throughout the system. Auspitz and Unna were the first to

<sup>1</sup> "Wege und Wandlungen des Syphiliscontagiums, etc.," *Mittheilungen der Wien. med. Doctoren Collegiums*, xiv. and xv. Band, 1888-89.

<sup>2</sup> "Ueber die Excision der Syphilitischen Initial Sclerose," and "Die Anatomie der Syphilitischen Initial Sclerose," *Vierteljahresschrift für Dermat. und Syphilis*, 1877, pp. 107 and 200.

<sup>3</sup> "Ueber die Excision der Hunter'schen Induration," *Wiener med. Presse*, Nos. 50 and 51, 1878.

bring out clearly the invasion of the vessels in the early stages of syphilitic infection. They, however, evidently reached the conclusion that the vessel-changes were limited to the area of the chancre, and that they only extended slowly beyond that circumscribed region during the latter part of the secondary period of incubation. Cornil's<sup>1</sup> views are also interesting. He says: "We cannot state it in an absolute manner, but we may venture the hypothesis that the syphilitic virus when deposited in the skin remains at first only locally active, but that it gradually affects cells in close contiguity, and prepares them for the hyperplasia which soon forms the chancre." It will therefore be seen that the prevailing ideas of the mode of syphilitic infection favored the view that the disease might be aborted. In the light of facts to be presented later on it would be a waste of time and space to give a general survey of the literature of excision of chancre. Any person desiring further information on this subject may consult the papers mentioned in the foot-note,<sup>2</sup> as well as those already referred to. The facts are briefly these: There have been reported about 460 cases in which excision has been performed, and in about 110 success has been claimed. I have not the slightest hesitation in saying that I do not believe that a single case of syphilis was ever aborted or annihilated by early radical procedures of any kind. Many of the cases reported as cured have undoubtedly been those of soft chancre which for some reason had become the seat of œdematous hyperplasia; and others were undoubtedly cases of relapsing chancres *in situ* (the pseudo-chancre, *induré* of Fournier), which are often seen late in syphilis, and commonly are not followed by any other lesions; while still others were in all probability instances of irritated herpes, which so often puzzle even the elect. I have several times seen acarian nodules upon the penis, and also on the outer female genitals, which had been pronounced even by intelligent physicians to be syphilitic neoplasms.

Then, again, besides the probable manifold errors in diagnosis of the excised lesions, in very many instances the cases were examined too cursorily and for too short a period, or at too long or too frequent intervals. Auspitz himself stated that four months' observation was sufficient. It may be that some of my readers, even in spite of what is said in this work, may think fit to try excision of chancre as a prophylactic in syphilis. If so, it is well for them to follow the requirements laid down by Fournier<sup>3</sup> in the study of this subject, which are as follows: "1. The man whose chancre is to be removed (and it must always be remembered that in these very early lesions the appearances are not sharply cast and a diagnosis is often difficult even for the expert) must be confronted with the woman from whom he derived his lesion, and she must be proven to be syphilitic. 2. A precise and clear period of incubation of from two to four weeks must be made out. 3. The observation of the case must be complete and well analyzed, and it must be proved [by microscopical examination—R. W. T.] that the excised lesion is a syphilitic chancre, and that the patient had not previously

<sup>1</sup> *Op. cit.*, Paris, 1879, p. 15.

<sup>2</sup> The reader is referred to an article by Leloir, *Annales de Derm. et de Syph.*, vol. ii., 1881, p. 69, and to Kaposi's *Path. und Therap. der Syphilis*, p. 419, for a full bibliography.

<sup>3</sup> "Traitement abortif de la Syphilis," *Gazette des Hôpitaux*, No. 116, p. 1071 et seq.



been syphilitic. 4. The patient must be carefully and at short intervals examined for a period of at least six months." Further than this, I may add that it must be proved conclusively that the patient has not taken mercury surreptitiously, for I can well understand that a man might seemingly consent to excision as a possible cure, and yet not care to take its chances, and for that reason take mercury on the sly.

The study of the question of the abortive treatment of syphilis will not be complete without the consideration of the bearing upon it of a number of cases recently reported showing an unusual mode of evolution of the disease. The following case, reported by Dubois Havenith,<sup>1</sup> will serve as a good specimen: A man sixty years old had coitus in the first days of July. Toward August 1st an erosion appeared on the prepuce which soon became indurated and caused phimosis. The diagnosis of infecting chancre of the prepuce was made. As the ganglia were not perceptibly affected, Havenith entertained the idea of circumcision as a means of aborting the syphilis. He sent the patient to Leloir, who confirmed the diagnosis and advised waiting until secondary manifestations appeared. Havenith has examined the man for a year every five days, and has seen no syphilitic manifestations. In the discussion of this case both Barthélemy<sup>2</sup> and Aubert stated that they had seen seemingly typical indurated chancres which were not followed by syphilis. In like manner, Burnett<sup>3</sup> reports a very striking case of a seemingly typical indurated chancre and inguinal adenopathy, both of which gradually disappeared without any treatment. Though carefully looked for at short intervals during a period of sixteen months, no evidences of syphilis were observed. Burnett quotes a similar case reported to him by Bryson, and also a case of similar import reported by Kaposi.<sup>4</sup> A further case, reported by Ehlers<sup>5</sup> of Copenhagen, occurring in the practice of Professor Haslund, is also reported, in which examination for one year failed to reveal secondary manifestations. These facts are certainly very striking, and open up a subject as yet very obscure to us. I have seen several cases similar to those just reported, and, although the objective features of syphilitic infection were complete, I have been disposed to look upon them as anomalous instances of simple localized hyperplasia. Perhaps, however, I am wrong. Burnett thinks these cases are instances in which syphilis became inert—as Barthélemy says, aborted—in the primary stage through influences which we do not understand, due to conditions of the organism or to a modification of the virus itself. Besnier,<sup>6</sup> however, is confident that some individuals, though inoculated with syphilis, do not become syphilitic, and he offers the following hypothesis: "When we consider the extraordinary immunity to syphilis presented by the entire animal kingdom, it occurs to us that some individuals, like animals, have in their physical condition, in

<sup>1</sup> *Comptes Rendus du Congrès international de Dermat. et de Syph.*, tenu à Paris en 1889, Paris, 1890, pp. 474 et seq.

<sup>2</sup> "Sur les Auto-inoculations du Chancre syphilitique," *Annales de Derm. et de Syph.*, 1885, pp. 200 et seq.

<sup>3</sup> "Induration of Venereal Sores not always an Indication that Constitutional Syphilis will Follow," *Journal of Cutaneous and Genito-urinary Diseases*, 1889, pp. 325 et seq.

<sup>4</sup> *Syphilis der haut und der Angrenzenden Schleimhäute*, Vienna, 1873, Lieferung 1, p. 22.

<sup>5</sup> "Cas de Chancre induré non suivi d'Accidents secondaires," *Bulletin de la Société Française de Dermat. et de Syph.*, 1890, pp. 365 et seq.

<sup>6</sup> *Ibid.*, p. 367.

an elementary condition of their solids and their fluids, something which is antagonistic to the germination of the syphilitic virus. The occurrence of such cases as these suggests the possibility that some of the reported successful cases of chancre excision were really instances in which syphilis aborted in its first stage. Then, again, the thought is suggested to the mind that if syphilis may really abort in its primary stage—in other words, if the patient's tissues are immune to its influence—have we not here another reason why it is well to withhold mercurial treatment until the general manifestations teach us that we have a case of syphilis on our hands?" This point will come up again later on.

In a report to the French Academy of Medicine,<sup>1</sup> Cornil, having gone carefully over the literature of the subject, pronounces excision of chancre futile, and he calls attention to the fact that its use may be dangerous, for the reason that a mercurial treatment may not be instituted and the disease will then run on unchecked.

The negative evidence as to the value of excision of chancre is very strong, and is offered by a number of observers. The classical case of Berkely Hill, in which he unsuccessfully cauterized a tear upon the penis within twelve hours after infection, is well known. Further than this, cases are reported by Razori, Coulson, Gibier, Mauriac, Thiry, Meyer, Zeissl, Zarewicz, Krowczynski, Bumstead and Taylor, and others, in which excision was practised at periods of twelve to thirty-six and forty-eight hours after the appearance of the chancre, in which syphilis developed in its usual way. I have several times removed hard chancres within the first day of appearance, and in each instance failed to abort syphilis. The following personal case well illustrates the average of cases of chancre-excision and its results: A gentleman, aged thirty, came to me early in 1889 in great distress of mind concerning a lesion on his penis which he had noticed for the first time the night before while taking a hot bath. The reason of his fear and worry was that a friend had a few days before informed him that he had contracted a hard chancre from a woman with whom he had learned that he (my patient) had had intercourse. Upon examination I found on the dorsum of the penis a very minute (one-tenth of an inch long) fissure of a dull violaceous color. I could discover no change in the inguinal ganglia. At his urgent request I examined the woman, and found just within the vagina, in the sulcus on the right of the urethra, a red and inflamed patch, the seat of considerable thickening. In the light of what I found besides I diagnosed it as a declining hard chancre, of which I had seen many similar before. There was marked inguinal adenitis and a very faint disappearing roseola, a mucous patch on the right pillar of the fauces, and slight fall of hair. The certainty of the syphilitic nature of the sore on the patient's penis, which appeared seventeen days after coitus, being so convincing, its probable character was announced to him. The condition of the skin of the penis was such that the little fissure could be cut away by means of a very liberal elliptical incision, and no harm would be done to the integrity of the organ. Under the most careful technique, with

<sup>1</sup> "Rapport sur la Mémoire adressé en réponse à la question suivante: Précises sur une série d'observations s'il exist un traitement abortif de la Syphilis confirmée," *Annales de Dermat. et de Syph.*, 1887, p. 60.

thorough antiseptics, I excised a piece of skin half an inch wide and three-quarters of an inch long on the evening of the day on which the fissure was first noticed and seventeen days after the infecting coitus. Examination of the patient was made almost daily. The wound healed kindly under iodoform gauze, and was not followed by any induration in the minute scar which was formed. It was fully twenty days after the operation that well-marked inguinal adenopathy could be made out. In fifty-two days after the first appearance of the chancre well-marked secondary manifestations were observed.

A very similar case has already been reported by me. Prior to June, 1891, therefore, while the majority of syphilographers believed in the absolute futility of chancre-excision as a means of aborting syphilis, a few still believed in its efficacy in some rather exceptional cases.

In Chapter LI. it is shown that from the very earliest hours of infection the morbid process runs rapidly down the vessels, and that in a few days parts far beyond are attacked; consequently, after excision of the chancre the infection is rapidly diffusing itself by means of the vessels throughout the entire system. (See page 533 and Figs. 192 and 193.)

These clinical and pathological observations therefore show why syphilis is not aborted by early excision or destruction of its initial lesion, even including a liberal slice of the surrounding parts. The reason, succinctly stated, is, that (contrary to the prevailing views) the syphilitic infective process is from the very start a quite rapid one. The poison strikes directly for the blood-vessels, and, causing there its peculiar changes, runs along them with astonishing rapidity. Thus it gains a foothold in parts beyond the reach of the knife, caustics, or electrolysis. In fact, the tissues of the whole penis in very early syphilis are, we may say, honeycombed by these infected vessels. These observations, supported by the evidence of the failure in chancre-excision, go to show that beyond the chancre there is sufficient syphilitic poison to infect the whole system, and that the initial lesion, through the visible and exuberant evidence of syphilitic infection, may be removed without in any way altering or modifying the course of the disease.

In my judgment, therefore, irrefragable proof has been offered which clearly shows the absolute futility of excision of chancre as a prophylactic of syphilis. It is necessary, however, as a matter of history, to record here in a brief manner the further and more radical operations which have been proposed for the extinction of syphilis. The recital will certainly act as a warning to future experimenters and theorizers, particularly if they will read what has just been said of the early stage of syphilitic infection. In 1871, Vogt<sup>1</sup> proposed that in addition to the extirpation of the chancre a like operation should be performed upon the inguinal ganglia. In the year 1872, Hardaway<sup>2</sup> in an elaborate paper showed that, according to existing views, syphilitic infection took place through the lymphatics, and arrived at the logical conclusion that extirpation of the ganglia, in connection with the chancre, offered a reasonable chance of aborting the disease. He simply made the sug-

<sup>1</sup> *Berliner klinische Wochenschrift*, 1871, No. 38.

<sup>2</sup> "The Pathology of Early Syphilis," *St. Louis Medical and Surgical Journal*, May, 1872; also "The Lymphatic Theory of Syphilitic Infection, etc.," *N. Y. Med. Journal*, vol. xxvi., 1877; and "The Radical Treatment of Syphilis," *ibid.*, Sept. 26, 1885.



gestion, unsupported by clinical evidence. Bumm,<sup>1</sup> however, in an article advocating chancre-excision, detailed seven cases in which the ganglia were extirpated, and in two of which he claimed that he had aborted syphilis. The next noticeable article on the subject was by Leuf,<sup>2</sup> who in an essay based on theoretical grounds regarded excision of chancre as only a halfway measure, and advocated the extirpation of the lymphatics of the penis and also of the lymphatic ganglia.

In this connection it may be interesting to remember that Neumann<sup>3</sup> recently showed a case of a man in whom he removed the chancre and the inguinal ganglia on the thirty-first day after the infection. Secondary lesions promptly appeared, followed later on by tertiary manifestations, which Neumann exhibited to the Vienna Medical Society.

This operation, if performed, occurs at an epoch in the patient's lifetime in which every effort should be made to place him in a position of superior mental and physical health, and when anything which may act as a shock or drain upon his system must be most sedulously avoided. For these reasons alone it is to be shunned. The operation is based upon false ideas of the pathology of syphilis. In the first place, it assumes that the virus of syphilis is in a fluid form, germinated and developed in the initial lesion; and in the second place, that this fluid virus runs up the lymphatic vessels of the penis without exudation or leaking, as Croton water runs from the reservoir to our houses. Now, the truth is, that the syphilitic virus or poison is an entity, and while it may, and perhaps does, contain a fluid plasma, undoubtedly, as shown by the microscope, it is made up of peculiar infecting cells, and the process of systemic invasion depends upon the peripheral increase of the original infected area. Secondly, this invading poison, whatever it may be, does not infect the system through two or more closed channels or pipes (lymphatics), but, like an army with the skirmish-line thrown out, followed by the invading body, is powerful along its whole line of advance. In this way the whole system becomes infected, and the culmination is reached at the period of generalized manifestations.

Extirpation of the ganglia, therefore, is not in any way indicated by the pathology of syphilis, and it may be classed with many other surgical vandalisms which unfortunately to-day are too frequently perpetrated.

It may be stated, however, that in some cases, where the anatomical arrangement of the parts warrants it, excision of chancre may be performed with benefit, thus removing a conglomerate mass of infection and a lesion in many instances slow to disappear.

We come now to the question: Can we by a general preventive treatment suppress, abort, favorably attenuate, or modify syphilis? Within a few years a method of treatment has been advocated which has for its purpose the eradication of syphilis by the prompt and vigorous use of mercury as early as possible in the primary stage. This treatment is really not new, since it is the same as that advocated by Fournier,

<sup>1</sup> "Zur Frage der Schanker-excision," *Vierteljahr. für Derm. und Syphilis*, 1882, pp. 259 et seq.

<sup>2</sup> "On the Eradication of Syphilis during the First Stage by Surgical Means," *N. Y. Med. Journal*, July 11, 1885.

<sup>3</sup> "On the Excision of Primary Sores and Enlarged Glands," *British Med. Journal*, May 19, 1890.

Bäumler, Mauriac, and others, who give mercury just as soon as the diagnosis of syphilis is made. If there is any difference between it and other methods, it is that the advocates of a general preventive treatment put a little more energy in their words, if they do not in their mercurial, and support their method by pleasing (to some) sentimental talk. That eminent surgeon, Mr. Jonathan Hutchinson, has within a few years published a very interesting paper on this subject, which does for it all that ingenuity of argument can do. Mr. Hutchinson<sup>1</sup> says that "if a scheme of treatment, begun in the primary stage, is planned to prevent the secondary phenomena, and generally does so, it may, I think, be fairly styled abortive in contradistinction with others which make no pretence to prevent the ordinary evolution of the malady." Certainly, such a treatment might be called abortive if it did prevent secondary manifestations and stamp out the disease, but no one thus far has given us any evidence that such a treatment has produced such a result. Mr. Hutchinson says that we must not strain the word "abortion" to mean utter annihilation, and he concedes that after his early and active medicinal dosage (using gray powder) he sees, somewhat exceptionally, scaling patches on the palms of the hands, sores in the mouth, and sometimes a general rash, and again, in some cases, tertiary lesions. As a matter of fact, therefore, he has seen the secondary stage delayed and the third stage not prevented. Seeing that such early and late manifestations have really appeared after the trial of a well-ordered and vigorous early preventive mercurial treatment, the thought obtrudes itself upon us that in cases in which such an early treatment has not been followed by general manifestations a simple non-syphilitic sore, in its incipiency, has been diagnosticated as a hard chancre. It is very often impossible for many days to say that a given sore is syphilitic, though it may present a specific appearance. Consequently, the liability to error on the part of those who in the very earliest days of a sore begin mercurial treatment is very frequent and very great. But an attentive reading of Mr. Hutchinson's paper has convinced me that his abortive method is a treatment of sentiment rather than of reality. He tells us that the early free use of mercury causes the indurated nodule to melt away with astonishing rapidity—a fact which can very frequently be verified by any one. But it must be remembered that this induration is not a very early sign or symptom of syphilis, considering the requirements of this early abortive treatment. It may be stated, I think, without fear of contradiction, that when we encounter a well-marked indurated nodule, that lesion is at least two weeks, and more probably three or even four weeks, old. Induration in a few cases occurs quite rapidly, but in most cases, particularly in private practice on careful and cleanly persons, the initial sore is soft, or, rather, not appreciably hard, for one or two weeks and sometimes for a longer period. After that time induration may develop more or less rapidly. Therefore, I am led to think that in many cases Mr. Hutchinson's abortive treatment merely antedated the evolution of the secondary period by a short time. Then, again, Mr. Hutchinson speaks of the early involution of the syphilitic fever under active mercurial treatment as being an evidence of the early abortion of the disease. It is true that

<sup>1</sup> "On the Abortive Treatment of Syphilis," *British Medical Journal*, Feb. 25, 1888; and "The Modern Treatment of Syphilis," *The Practitioner*, June, 1891.

mercury will lower the temperature in early syphilis, but it is none the less true that this rise of temperature is generally concomitant with the appearance of general manifestations, though in some cases it may be observed a few days or a week, or at the most ten days, before that critical period. Here, again, we have in Mr. Hutchinson's paper intrinsic evidence that while he entertained the idea that he could abort syphilis in some cases, he only began the treatment at about the same time that others usually begin it. I have taken the pains within a few years to question carefully a number of gentlemen who begin the use of mercury early or who rely upon its early use as a means of aborting syphilis, with a view of ascertaining just how soon in the life of the sore or in the evolution of syphilis they begin a mercurial treatment, and I found them divided into two groups: in the first are those who as soon as they see a sore which they regard as suspicious immediately give mercury; and in the second those who are more careful and scientific, and who by their own confessions admit that they allow days and weeks to elapse in many cases pending the verification of the diagnosis of syphilis. So that I am led to think that while many men cajole themselves with the idea that they begin the treatment of syphilis at once, really, for one reason or another (chiefly those of doubt and uncertainty), they usually wait well-nigh up to the date of secondary manifestations, if not, indeed, up to it, before they begin general mercurial treatment. They pass current, however, as advocates of early mercurialization. The truth is this, that in the hands of most men who are careful and conservative the disease is well on to its stage of generalization before treatment is instituted.

A method of abortive treatment of syphilis has been worked out by Bronson on a purely theoretical basis. Bronson<sup>1</sup> thinks that we may cause the rapid disappearance of the initial lesion and the probable abortion or prevention of the secondary stage by hypodermic injections around and under the nodule on the penis, into the substance of the inguinal lymphatic ganglia, and into the territory of integument "whose lymphatic vessels tend in their course to the ganglia which are the seat of the disease." This theory was perhaps tenable in the days when we thought that the chancre was the circumscribed focus of deposit of the virus, that the lymphatic vessels were its means of transportation, and that the nearest ganglia were the storehouses of the ripening infection. Practically, the injection of mercurial solutions under the chancre and under the skin of the penis will turn out in any one's hands a failure, and a source of discomfort, suffering, complaint, and lamentation on the part of the patient. Though this procedure was advocated by Weisflog, Lipp, and Lewin some years ago, I have no knowledge of its adoption and use by any one. Therefore I think that Dr. Bronson's charmingly written essay, which ends with this passage, "Better it is to act on any chance, however slender, than be bound helplessly to a dogma that is open to question, and that would leave the victim of an insidious infection without succor and without hope during what may be the most momentous period of his disease," will go to posterity as a sample of good English composition and of humane inspiration, rather than as a watchword against a supposed lethargy in the therapeutics of syphilis. In my judgment, the early

<sup>1</sup> "On Preventive Treatment of Primary Syphilis," *New York Medical Journal*, March 24, 1888.



preventive treatment is barren of beneficial results, and leads to all sorts of errors regarding all kinds of sores found on the human genitals. I have never seen, nor have I heard of, a well-detailed authentic case of syphilis thus cured, and I doubt whether I ever shall. Consequently, I am not a believer in the practical application of Fournier's dictum that it is easier to prevent than to cure. I agree with Kaposi regarding the early preventive treatment of syphilis, that it is rational and humane, but not practical.

In support of what I have said I think it well to present the views of a number of eminent authorities. Thus, Kaposi<sup>1</sup> declares that early treatment does not prevent the appearance of the general symptoms, but only delays them, that the symptoms appear irregularly, and that mild eruptions do not occur exclusively, but that there may be very early severe symptoms. Not alone is the development of severe symptoms, especially those of the central nervous system, accelerated, but in rare cases, in which severe early symptoms remain absent, injury results to the patient in that the syphilis runs a much slower course than when no early treatment has been adopted. Doutrelepon<sup>2</sup> very correctly states the case when he says, "Sometimes very disagreeable gummous forms appeared, although the milder secondary symptoms had remained absent." Neumann<sup>3</sup> also states the facts very clearly when he says that while cutaneous eruptions and enlargement of the ganglia predominate when there has been no early preventive treatment, after the latter we find that the mucous membrane of the mouth and pharynx, especially the lips and tongue, are particularly apt to present patches (and ulcers) in spite of the most careful local treatment. He found that the rash is delayed about sixty-two days, and I have seen it appear as early as that, and as late as ninety and one hundred and twenty days. He rightly concludes that the success of the early preventive treatment is ephemeral, and that notwithstanding its adoption syphilis will inevitably run its course. Further than this the words of Kobner<sup>4</sup> are of great significance. This observer up to the sixties of this century followed the routine then in vogue—namely, early preventive treatment—and he declares, with large experience, that he has seen only two cases in which the outbreak of general symptoms was apparently entirely prevented. In all other cases he saw syphilis run its course in spite of a most active inunction-treatment during the primary period. He further says that, unfortunately, he has frequently observed that those individuals who had received inunctions immediately after the diagnosis of the primary lesion exhibited disproportionately early severe and fatal symptoms on the part of the central nervous system. Equally as significant are the words of Bärensprung,<sup>5</sup> who says: "I have seen the most severe and rapid destruction almost always in those cases in which inunctions were used against the primary or first secondary lesions;" by which latter he means the inguinal adenopathy. Diday also is opposed to an early preventive treatment, and Leloir concludes that it is produc-

<sup>1</sup> "Ueber Therapie der Syphilis," Separat abdruck aus der *Verhandlungen der Congresses für Innere Medizin*, Wiesbaden, 1886.

<sup>2</sup> *Ibid.*

<sup>3</sup> *Ibid.*

<sup>4</sup> *Ibid.*, and "Aphorismen zur Behandlung der Syphilis," *Berlin. klin. Wochenschrift*, Dec. 29, 1890.

<sup>5</sup> *Die Hereditäre Syphilis*, Berlin, 1864, p. 17.

tive of no good. Finally, I may quote the recent utterances of the younger Zeissl,<sup>1</sup> who voices the opinion of his deceased father as follows: "As a compensation for the few days' delay in the outbreak of the general symptoms, these run an irregular course and severe forms occur early. A further disadvantage of mercurial preventive treatment is the fact that the syphilis becomes more obstinate, in so far as the symptoms of the condylomatous period yield much more slowly, than if mercury has not been used until the appearance of this stage. We have therefore achieved nothing by preventive treatment, except to weaken our chief weapon against syphilis." Further evidence certainly is not necessary. I can confirm from prolonged observation and experience all that these authorities have said and claimed as to the inutility, general unadvisableness, and even danger of an early preventive treatment.

### Treatment of Chancres.

When seen at a very early date upon the male genitals the chancre usually appears like a minute round or oval excoriation or as a papule with a scaly or an oozing surface. So much does this, the earliest of all evidences of syphilis, resemble simple benign lesions that mistakes are very liable to occur, and a chancre may be diagnosticated as an excoriation, an abrasion, or as a simple inflammatory papule, or *vice versâ*. Under these circumstances the physician cannot be too careful and guarded in the diagnosis of any seemingly insignificant lesion upon the penis. It is well to warn a patient not to indulge in sexual intercourse for at least two weeks, by which time the nature of the lesion will be beyond question, since if it is benign it will commonly heal under simple treatment and cleanliness, and if it is an incipient hard chancre its evolution will continue and its appearance will indicate its character. It is of the utmost importance that no stimulating or escharotic applications should be made to these small lesions, for very good and sufficient reasons. In the first place, if the lesion is simple in nature, burning it with acid or other caustic will not destroy it, but simply transform it into an inflammatory nodule, which may present a striking resemblance to a young hard chancre, and thus doubt and uncertainty of mind are induced or an error in diagnosis is the result. If the lesion is an incipient chancre, it is a localized specific neoplasm, which cauterization, however severe, cannot possibly destroy, but it can cause a complicating œdema which may be troublesome to cure. Therefore it may be stated as a golden rule that we must not lay violent hands on these seemingly and perhaps insignificant lesions. Any breach of surface, therefore, should be kept scrupulously clean by washing, and its surface may be covered with lint or absorbent cotton moistened with water. In many cases a water dressing is sufficient, but mild solutions of sublimate (1 : 1000, 2000, or 3000) may be applied, or very dilute watery solutions of carbolic acid. These applications may be made every two, three, or four hours. Peroxide of hydrogen 1 part and water 6 parts make a solution which will produce an antiseptic effect. As the hard chancre grows larger it may be treated with black wash, with yellow wash, or the red wash, which is made as follows:

<sup>1</sup> "Der Gegenwärtige Stand der Syphilis-therapie," *Klinische Zeit und Streitfragen*, Vienna, 1887, p. 173.

R <sub>x</sub> . Zinci sulphatis,	gr. viij ;
Spiritus lavandulæ comp.,	ʒij ;
Aquæ,	q. s. ad ʒiv.—M.

It must be understood that the therapeutical effect of these lotions is simply protective and slightly stimulating. They prevent irritation and ulceration by keeping the parts clean and aseptic. The chancre offers a nidus for pus-producing microbes, and when it is not large antiseptic washes are all that is required in the way of treatment.

Petersen<sup>1</sup> has used a solution of yellow and blue pyoktanin of Merck (1:1000, or even 1:100) upon hard and soft chancres, and he claims that he has had good results. The chief advantages are that it is inodorous, and in antiseptic power not inferior to iodoform. The stain of blue pyoktanin may be removed from the hands by washing them well with a strong soap-lather and, after drying, pouring alcohol over the spots. The late Dr. Palmer of Louisville informed me that he had employed with much satisfaction, in the treatment of hard and soft chancres, a watery solution of fuchsine (1 drachm to the ounce), which he paints well over the morbid surface, which he then covers with absorbent cotton.

Chancres covered with a false membrane, thick or thin, those which show a tendency to become necrotic upon their surfaces or in which a decided tendency to ulceration is seen, may not be sufficiently influenced by the foregoing applications. In these cases it is important that a decidedly caustic effect should be produced. In cauterizing hard, as well as soft, chancres, carelessness and recklessness must be carefully avoided. The lesion to be treated should first be carefully washed with soap and water, and then irrigated with a 5 per cent. carbolic solution. Then it should be dried and a solution of cocaine applied to it, and then it should be dried again. We no longer use the carbo-sulphuric paste (sulphuric acid and charcoal) nor the Vienna paste (chloride of zinc and flour), for they are difficult of application and too caustic in their effects. Cauterization by heat is repugnant to patients, and not necessary. As a routine application nothing is better than fluid carbolic acid or pure nitric acid. These agents should be sparingly, carefully, and not frequently applied to the surface of the sore, and not beyond it. A small quantity of cotton rolled on the end of a wooden toothpick offers the most effective and satisfactory means of application. It may be well to mention that Gunz<sup>2</sup> of Dresden advises the use of concentrated muriatic acid, after which he covers the surface with a little bicarbonate of sodium, and then applies cold compresses. In case the surface cauterized is quite large, it is well to send the patient at once to his room, where he should lie down. It is well to bear the fact in mind that this destructive treatment is only indicated in cases in which the surface of the sores is unhealthy and shows no tendency to heal. After cauterization it is necessary to apply antiseptic remedies in the powder form. It is always imperative that these lesions should be carefully washed twice a day, and the patient should be warned to destroy, preferably by fire, all linen used in the cleansing, and to be

<sup>1</sup> "Die Desinficirende Wirkung der Anilinfarben von Merck, Pyoctanin," *St. Petersburg med. Wochenschrift*, No. 27, 1890.

<sup>2</sup> *Die Behandlung der Syphilitischen Geschwüre nach den Neuren Methoden*, Leipsic, 1891.



careful not to touch with soiled fingers any article which others may handle.

Among antiseptic powders iodoform still holds its position without a peer or rival. New remedies come and go, but this one stays by us. It may be said without fear of contradiction that for the dressing of ulcers and wounds about the genitals, male and female, there is no remedy so efficient or which has such a wide range of usefulness. Its odor is of course objectionable, but with care much of this inconvenience may be obviated. In the first place, the powder must be very carefully and sparingly put on the surface, and not allowed to drop on sound parts or upon the clothes. Then, if the lesion is under the prepuce, the odor may be kept at a minimum by packing cotton in the preputial orifice. If the lesion is on an uncovered part, it should be enveloped in absorbent cotton and then covered with gutta-percha tissue. A little care and ingenuity will do much to dissipate a patient's disinclination or repugnance to the use of this drug. Though many drugs have been recommended as having the power of deodorizing or disguising the odor of iodoform, none, in my judgment, have proved successful. By far the best deodorant is cumarin, which in small quantities may be added to iodoform. It must always be remembered that this powder is only applicable to unhealthy and necrotic surfaces, and that when a smooth healing surface has been produced its use must be discontinued and one of the simple stimulating or antiseptic lotions or powders should be substituted.

Iodol has now been on trial a number of years, and has proved itself to be a feeble agent, comparable in its effects to subnitrate and subiodide of bismuth. Where little is required it may be used and may prove satisfactory, but in severe cases this powder forms a crust over the surface, and beneath this the destructive process goes steadily on. When there is danger ahead, never trust to iodol.

Loretin is the name of a new yellow crystalline powder recommended by Schinzinger<sup>1</sup> as a substitute for iodoform. It lacks the disagreeable odor and the toxic properties of iodoform. In operative surgery it is said to have proved very beneficial.

The latest agent presented as a substitute for iodoform is called di-iodoform, and is recommended by Maquenne and Taine.<sup>2</sup> This preparation is an iodide of carbon, being particularly rich in iodine. It is said to be very efficacious in the treatment of soft and hard chancres and of unhealthy ulcers and wounds. Kept in the dark, it remains odorless; exposed to the light, it turns brown and emits a characteristic but slight odor. Hallopeau is said to have found its effects in chancreoids identical with that of iodoform.

Aristol is scarcely more efficient in really active lesions than is iodol. There are those who *see* good effects in every new preparation, but they are usually not careful and critical judges. The fact that aristol will act seemingly favorably upon a chancre whose course is attended with slight ulceration and destruction is no evidence that in a graver exigency it will prove efficient. In my experience (and I have tried it extensively) aristol has shown no decided therapeutic power, certainly

<sup>1</sup> *Centralblatt für Chirurgie*, 1893, No. 45, p. 984.

<sup>2</sup> *Lancet*, Nov. 26, 1893, p. 1355.

none more marked than that shown by iodol, subiodide of bismuth, subbenzoate of bismuth, and other such powders. Though it is odorless, it leaves an objectionable sticky feeling on the fingers and on the parts to which it is applied. If you have a bad case, be sure to use iodoform; and if you have a mild case that any indifferent powder will help, prescribe iodol, aristol, or some other new remedy. If you do nothing else, you will show that you are progressive and that you keep abreast of the times, and among some that will have its effect.

Many chancres in a necrotic state will be much benefited by the application of calomel covered with cotton. Salicylate of mercury has been recommended for this purpose, but it should never be applied in its pure state, for it exerts an unpleasant irritant and destructive action upon the mucous membrane. It may be combined with talcum powder or starch in the proportion of 1 drachm of the mercurial to 4 or 6 drachms of the inert powder. Salicylic acid is uncertain in its effects, and if applied in its purity causes irritation.

The cup of happiness of the seeker after therapeutic novelties must certainly now be nearly full, for every month brings us a new antiseptic remedy, usually from Germany, which is to supplant iodoform. In order that I may not appear behind the times, I will enumerate these new remedies and their sponsors, so that any one can put them to a practical test:

Bazilivitch<sup>1</sup> claims that he has had excellent results in ulcerated chancres by freely powdering their surfaces twice a day with antifebrin (Merck). He further claims as advantages that it is cheap, free from odor, and will not give rise to dangerous phenomena from absorption.

Salol has also been extolled by Salsotto<sup>2</sup> and others in the treatment of hard chancres, but the drawback to its use is the fact of the difficulty of obtaining it in sufficiently fine powder that it will not act as an irritant. A combination of salol 1 part and some inert powder 2 parts may be of service in some mild cases of ulcerating chancres.

Sozo-iodol has been extolled by Lassar,<sup>3</sup> and it may do good service in some mild cases.

The subgallate of bismuth, also called dermatol, has been proposed by Heinz and Liebrecht<sup>4</sup> as a substitute for iodoform. They claim that it has decided healing properties and that it is inodorous and non-poisonous.

Sansoni<sup>5</sup> of Turin, among other remarkable qualities, claims that euphorin (Merck) is better than any other remedy as an application to obstinate ulcers. I suspect that within a short time we shall have some highly laudatory accounts of the effect of this agent in the cure of chancres.

Euophen, introduced and recommended by Goldmann,<sup>6</sup> is said to have a brilliant future before it as an antiseptic.

And, lastly, sulfaminol (Merck) comes before us as an inodorous, painless, antisyphilitic remedy, which Robertson<sup>7</sup> regards as supe-

<sup>1</sup> *Medizinskoïe Obozrenië*, Nos. 13 and 14, 1890.

<sup>2</sup> "Salol ed il su. uso terapeutico in alcuni morbi venerei," *Giornale Ital. del mal. Ven. e della Pelle*, 1887, pp. 345 et seq.

<sup>3</sup> "Ueber das Soziodol," *Therapeut. Monatshefte*, Nov., 1887.

<sup>4</sup> *Berliner klinische Wochenschrift*, No. 24, 1891.

<sup>5</sup> *Therapeutische Monatshefte*, Sept., 1890.

<sup>6</sup> *Pharmaceut. Zeitung*, July 15, 1891.

<sup>7</sup> *British Med. Journal*, Aug. 29, 1891.

rior to iodoform. It has not as yet been used in the treatment of chancre.

It must not be forgotten that the main benefit of all antiseptic remedies for chancre consists in their power of preventing ulceration, and by this means they hasten the cure. It is important, however, that a specific action should be brought to bear on all chancres which show a tendency to become indurated. Having by the proper means produced a healthy surface, the chancre should then be treated with mercurial ointment. The surface having been washed and rendered as nearly as possible aseptic, a layer of absorbent cotton or lint well smeared with this ointment should be placed upon it, and then kept in constant apposition. It is important that the dressing should be renewed two or three times a day.

Chancres of women require the same general treatment as is used for those of men. In many cases they run their course and disappear without treatment and perhaps without recognition. In some cases, however, they are obstinate and persistent, and require time and care for their removal. It is always imperative that the vagina and vulva should be kept particularly clean in women having syphilitic chancres. They should use frequent irrigations of hot water to which borax, alum, sulphate of zinc, or carbolic acid is added. Then the parts should be kept as dry as possible, for which purpose tampons of absorbent cotton are very effective. In some cases extensive and troublesome indurating œdema becomes a complication of the vulvar chancre, and its presence means a long siege of annoyance and perhaps suffering. When possible, chancres in the female should be dressed with mercurial ointment in the manner above described. If the induration is extensive or if it shows a tendency to spread, it is well to cover the chancre and a liberal area of the parts around it with the ointment. In some cases a strong calomel or white-precipitate ointment may be used in place of the mercurial ointment.

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## CHAPTER LXXXV.

### THE GENERAL METHODICAL TREATMENT OF SYPHILIS.

It is very important to know when to begin systemic treatment in syphilis, and the questions naturally arise: Shall we begin general systemic treatment as soon as a positive diagnosis is made, or shall we wait until the evolution of the secondary period proves to us that the climax has at last been reached and that the whole organism has been involved? We have already seen that no clear evidence has been adduced proving that an early mercurial course can abort or favorably modify the syphilitic infection; and it has been shown that, in spite of such treatment, early and late lesions have appeared. This fact has been observed by many physicians. As I have already said, it is very probable that few authorities follow the letter of the law which they lay down—namely,



to begin treatment at once as soon as they are reasonably certain that they have syphilis to treat. Though the advocates of this method of procedure are quite numerous, those who counsel delay until all possible doubt of diagnosis is removed are even more numerous. These advocates of early treatment base their view largely on sentimental grounds, and do not present strong, telling facts in their support. They picture a patient in the meshes of a severe chronic infectious disease, and claim that the dictates of humanity call for its early eradication. On the other hand, those who advocate a policy of delay are equally as much impressed with the gravity of the patient's position, and are equally ready and zealous to help him; and they think that they can do so with more certainty by waiting until they have a distinct morbid entity to treat than they can if they begin the use of mercury when the disease is yet in an unsettled and mythical condition. At best, early treatment only delays the appearance of secondary manifestations for a longer or shorter time, and as a rule does not lessen the severity or extent of their distribution, and in many cases seems to render them more severe. And when we have said this we have said about all that we can in favor of the treatment of syphilis, early or late, in its primary stage. On the other hand, it is the consensus of opinion of very many eminent men, as we have already seen, that this early treatment is really productive of harm, in the fact that it induces a disorderly course of the disease.

Moreover, early treatment takes from the physician at the outset—which is the most important period in the life of the syphilitic—those criteria which are to guide him in the management of the patient, and very often leaves him in a very uncertain and uncomfortable state or condition of indecision and doubt as to whether his patient is really syphilitic. Then, again, when a patient has been pronounced to be syphilitic, he himself generally wants to see some undoubted signs and symptoms of the disease. I have many times seen patients who had received early mercurial treatment, and had witnessed no other evidence of syphilis than a chancre, cease treatment or refuse treatment after the lapse of a month or two of early mercurialization, and later on develop severe, and even deadly, lesions. Many patients, seeing nothing on their bodies in the early months of the infection (as a result of early treatment), convince themselves that they never had syphilis, and others remain in doubt, and in very many cases they will not follow subsequent treatment in the persistent and methodical way which is so essential for the cure of the disease. These cases have a surfeit of treatment very early in the disease, and an absence of it later, so that while they are not the gainers by the early medication, they are often, to their sorrow, the losers by the absence of treatment at subsequent periods. Further, we must, as Von Düring<sup>1</sup> remarks, consider fully the mental injury inflicted upon a patient by a premature, and perhaps unfounded, diagnosis of syphilis, which causes him during his whole life to be in constant dread of relapses, and, I may add, to be in a state of mind which attributes to his early (perhaps putative) syphilis every lesion or affection, however simple, which may thereafter befall him. To my mind, it is most salutary for the syphilitic to be convinced beyond any doubt that he is syphilitic, for in most cases the

<sup>1</sup> "Frühbehandlung der Syphilis oder Nicht," *Monatshefte für Prak. Dermat.*, vol. ix., 1889, p. 490.

revelation brings him to a realization of his true condition, and impresses upon him the necessity of care and watchfulness as to his mode of life and docility to his physician in order that in due time he may be cured.

Let us now turn to the pathological condition which syphilis presents. It is chronic and infectious in character, and manifests itself by the development of a low grade of connective tissue, which tends to indefinite reproduction in greater or less degree through periods of activity and remission in any and all of the tissues and organs of the body. In all probability the malign influence of syphilis upon the human organism is directly due to the infiltration of this tissue, to the irritative and inflammatory conditions incident to the hyperæmia which accompanies this proliferation, and last, but far from least, to the secondary destructive and atrophic changes which take place in the tissues in the various metamorphoses of these specific new growths. Clinical and pathological observations have shown that mercury possesses a specific power over this low grade of infectious tissue, and it is very probable that it causes its necrobiosis or its burning up, or that it produces its removal by the induction in it of fatty degeneration, which renders it ready for absorption. In my judgment, syphilis is not mature until the date of secondary manifestation, when the newly-formed young round-cells are proliferated in vast quantities, and are thrown into the general circulation, and by it carried throughout the body. In the same way in the acute infectious diseases small-pox is not ripe until the evolution of the pustular rash, nor scarlatina until the appearance of its intense generalized erythema. When, therefore, the morbid processes have so far advanced that a generalization of their products has occurred, syphilis may be said to be ripe, and then, and not till then, have we anything really tangible to treat. Mercury given before this critical cell-explosion has very little to work upon, and therefore is productive of a limited amount of good. Indeed, to my mind, when given thus early, while it may have some influence upon local processes—namely, on parts the seat of the chancre and the adjoining territory—it is productive of harm by influencing the tissues too early, which influence does not give them an immunity to the subsequent syphilitic process of invasion. In other words, mercury given before the generalization of syphilitic products does not favorably influence the resistance of the tissues to the impending invasion, and certainly does not render them immune to it. On the contrary, the early exhibition of mercury induces a condition of tolerance in the tissues which renders its action less powerful and certain at a later date when they are infiltrated with syphilitic products. In short, we take the cutting edge off of our most potent remedy by administering it to a system as yet not charged with the virus which it is our hope to destroy. We are really treating before we have got anything to treat.

We very frequently see a parallel condition later on in syphilis in patients who have for long periods taken small and continuous doses of mercury, and in whom (as so often occurs) syphilitic new growths appear in the skin and elsewhere. In these cases a low grade of mercurialization is induced which has no power at all over syphilis, since its lesions appear notwithstanding the fact that the patient is taking mercury regularly. Now, this mercurialization tends to lower vitality and impair nutrition, and the general condition which it induces ties our hands, so that we can

do very little good with mercury until the system has been renovated; then by the use of proper doses of the drug the syphilitic lesions may be made to yield.

There is another important consideration. In the primary period of syphilis it is well to prepare for the secondary stage by fortifying the patient's system, by putting him in a good physical condition, and in preparing the stomach, if necessary, for the ordeal which it will have to pass through. In this primary period in very many cases tonics and remedies designed to improve digestion should be given. Then in due time mercury will be well borne, and it will promptly act upon the syphilitic virus and its effects.

I have carefully studied this question for more than twenty-five years, and I am now more than ever convinced that it is by far the best plan in most cases to wait until the onset of the secondary stage before we begin a mercurial course. In thus waiting it must be remembered that we are not to fold our arms and do nothing; we must regularly examine our patient; we must look after his general well-being, mental and physical, encourage him with hopeful prospects, and prepare him for his coming ordeal, the crucial one perhaps of his life. Then, just as soon as general symptoms and manifestations begin to appear, and we know that we are right and appreciate fully what we have got to treat,—then we must begin our mercurial treatment with vigor tempered by watchful care of our patient and an enlightened and conservative knowledge of therapeutics.

While, therefore, it is best to begin the treatment of syphilis at the very earliest moment of the secondary period, there are conditions or exigencies which arise in the primary period which call for, and sometimes demand, the very earliest administration of mercury. These may be summed up as follows:

1. When the initial lesion from its site, size, depth, or extent causes much pain and discomfort or interferes with the function of parts, or from activity of ulceration threatens to destroy them—prepuce, penis, urethra (chiefly in cases of phimosis and paraphimosis), clitoris, fingers, eyes, nose, lips, tongue, tonsils, breast, and anus. Also in cases in which dense induration around the urethral orifice or in the urethral canal produces a stenosis of that canal, and again in cases of very large (elephantine) extra-genital chancres upon the legs, arms, buttocks, and cheeks or face.

2. In some cases in which there is a tendency to the development of exuberant indurating œdema around the chancre, which may seriously discomfort or cripple the patient or impair the functions of the part, as we sometimes see in chancres of the lips, near the frænum, and upon the external female genitalia, and complicating chancres of the anus, and also in cases of chancres just within the vaginal introitus.

3. In certain of those cases in which, from its situation, the chancre may lead to infection of others, such as the fingers of surgeons, obstetricians, dressers, orderlies, and midwives, the nipples of wet nurses and others who suckle children other than their own, in cases of chancre of the lips and tongues of infants, and in cases in which the lesion occurs on the lips or elsewhere of young, careless, and thoughtless persons who are liable to spread the infection.



4. When the enlargement of the lymphatic ganglia or the lymphatic cords (particularly of the penis) is excessive and causes inconvenience, impairment of function or locomotion or movement of the arms, or produces much discomfort and disfigurement in the neck and submaxillary region, at the elbow, in the axillæ, and groins.

5. In some cases in which chancres are complicated with a pyogenic infection attended with pain, fever, and perhaps typhoidal symptoms, chiefly on the fingers, but also, though rarely, on the nipple and mammæ, and sometimes on the penis and vulva (in careless, uncleanly subjects). Also in some cases in which gangrene and phagedæna are complications.

6. In cases in which conjugal or sexual relations render the disappearance of the chancre necessary or imperative.

7. When the extreme anxiety and fear and the unreasonable impatience of the bearer render it imperatively necessary.

8. In those somewhat exceptional cases in which severe cephalalgia, neuralgia, pleuritic and intrathoracic discomfort and pain, pains in the bones, joints, and fasciæ, are precocious.

9. In cases of women infected in the early months of pregnancy, in order, if possible, to prevent subsequent abortion; and in cases of chancre of the vulva and introitus vaginæ in order to remove a possible obstacle to childbirth, and, if very late in gestation, to prevent the infection of the child *in transitu*.

Kaposi<sup>1</sup> says that whenever he has been led astray by logic or external conditions to adopt a general treatment by mercury before the onset of the second stage, he has been sorry for it afterward; and my experience in the main accords with his. In these early medicated cases there are always, of necessity, data and criteria lacking, and as a result the physician does not feel as certain of his ground as he does when he and his patient have seen the earliest general manifestations of syphilis, and when he has by their observation and study gained a pretty clear general idea of what course the syphilitic infection is going to take.

To sum up, then, we may state that in most cases no advantage or possible benefit to the patient is lost by withholding mercury until the onset of the second stage, nor is the patient thereby put in any jeopardy, present or future, nor are his chances for ultimate permanent cure in any way impaired, modified, or crippled. On the other hand, his syphilis will be more orderly, and conspicuously more amenable to treatment, his physician will not grope in the dark, and will, if he promptly attacks the disease in the conservative but vigorous manner soon to be detailed, be spared the hesitancy, doubt, and uncertainty of mind which are the inevitable lot of those who attack the disease prematurely.

The date, therefore (as a general rule), at which the treatment of syphilis should begin is that at which the disease culminates in the general infection of the economy—namely, just as soon as the general rash appears, together with the other manifold symptoms of the secondary period.

*Mercury.*—The experience of more than three hundred years has shown, in no uncertain manner, that mercury has the most marked and salutary effect in the treatment and cure of syphilis, and that if properly handled it may almost be termed an antidote or specific for that

<sup>1</sup> *Loc. cit.*

dread and potent disease. Though sarsaparilla, guaiac, saponaria, stil-lingia, smilax, china, sassafras, dock-root, cascara amarga, berberis aquifolium, tayuya, and other vegetable agents, as well as preparations of gold, chromate of potassa, etc., have from time to time been put forward and vaunted as the true specific, they have none of them attained a firm standing in the therapeutics of syphilis, and have each been abandoned as powerless and worthless. To-day there are few authorities who decry or inveigh against mercury, whereas fifteen or twenty years ago the doughty, noisy, illogical, and bigoted disciples of old Ulrich von Hütten were ever ready with their imprecations against the drug, and with their false assertions as to its dangerous and even lethal character.

Mr. Hutchinson,<sup>1</sup> referring to British medicine, says: "Excepting in Edinburgh, I believe that there are at present in the profession scarcely any antimercurialists left, and I may remark, in passing, that during the last few years some of the most severe cases of syphilis which I have seen have come from Edinburgh, and had been treated in the early stages by systematic abstinence from mercury." I know of but one anti-mercurialist in America.

Used carelessly and in the unstinted manner of old times, mercury certainly may be productive of harm; but in no department of medicine have more advances been made and more enlightened conservatism been engrafted than in the treatment of syphilis by mercury. In place of the powerful doses and inevitable salivation and other bad results arising from the use of mercury as given years ago, we to-day use milder doses, which produce amelioration and cure of the disease without, as a rule, untoward complications. While it may be said that the modern attenuation of the dosage of mercury has been an incalculable advance in syphilis therapy, it must also be confessed that in the hands of some physicians this attenuation has gone on almost to the point of emasculation. In other words, in the reaction from the rash and vigorous mercurial dosings of other days some observers have jumped too far, and to-day give mercury with so sparing a hand, and with so much mystifying arithmetical calculation, founded on theory rather than on prolonged observation of the disease and its treatment, that they produce a treatment which is really a perversion of one of the greatest therapeutic blessings which we possess. While, therefore, mercury is by all odds the great and reliable remedy against syphilis, its dose must not be too much attenuated. On the other hand, it must not be administered with too lavish a hand, but carefully, guardedly, with full and repeated observation of the patient's general condition, and with a watchful care as to how the lesions are affected by its use. In short, the treatment of syphilis means on the part of the physician a full knowledge of the disease, a consideration of the patient's strength or weakness, a close familiarity with the lesions and with the workings of the syphilitic virus in his system, and an accurate knowledge, based upon frequent observation and interrogation, of the manner in which the remedial agent affects his system and the general morbid condition. In other words, the physician has not the abstract problem—syphilis—to treat, but he has a human being infected with a chronic multiform disease as the subject of his study, and for whose relief and cure he

<sup>1</sup> "The Modern Treatment of Syphilis," *The Practitioner*, June, 1891, p. 403.

must familiarize himself with his constitution and watch and guide the effect of his therapeutic agent.

As an adjuvant to mercury in the main, and rather exceptionally as the mainstay of syphilitic medication, we also have iodide of potassium and of sodium. These agents play a very important part in syphilitic therapeutics, and fairly deserve second place to mercury.

Then, also, we have as adjuvants all kinds and modes of hygienic and careful regimen, and we invoke to our aid all the most efficient tonics and hæmatics. Let us now consider some of the principal methods of treating syphilis in vogue at the present day.

*Expectant Method.*—The expectant treatment is the outcome of the theoretical cogitations of Diday, and is advocated mainly by himself and the younger Zeissl, who inherited this therapeutic heirloom from his father, who was also given to Diday's way of thinking. It is an easy-going, happy-go-lucky system of therapeutics, which is fraught with uncertainty, danger, and disaster to the unhappy person who is subjected to it. As a piece of sophistry these therapeutic lucubrations of Diday charm us by their bright diction and their brilliant but untenable assumptions. The only points worthy of mention in this treatment are—first, that it carries with it injunctions to begin treatment, as a rule, at the commencement of the secondary period; and, second, that all cases have their own peculiar form of this disease, and that they must be watched as to the character, extent, and portentousness of their manifestations from early until late. The latter injunction is to my mind the only part of Diday's writing upon this subject worthy of remembrance. Diday claims, for the reason that a small percentage of cases seem to end in the secondary stage, that syphilis is a self-limited disease, with a constant tendency to expend itself, or, as we may say, run itself out. He divides syphilis mainly into two varieties—the mild and the severe—for each of which he gives mercury only temporarily according to various figurative data. He calls his system also the opportunistic treatment, and bases it upon the assumption that Nature makes an effort to rid herself of syphilis. He very rightly emphasizes the importance of careful hygiene and regimen during the course of syphilis. He denies *in toto* any preventive action of mercury, particularly in the secondary period, and claims that in many mild cases tonics and hygiene will cure the disease. He singularly fails to emphasize the fact we so often notice that a very mild early syphilis very often leads to disaster and death. Succinctly stated, Diday's opportunistic treatment consists in giving mercury or iodide of potassium when syphilitic symptoms show themselves, and when these have disappeared to wait again for another outburst. He is emphatic in his disbelief that mercury has any preventive or curative action in the intervals of repose or latency. Though I think that Diday's doctrine of therapeutics is false, sophistical, and dangerous, it is none the less a part of the history of syphilis; therefore I give it here for what it is worth, as it may appeal favorably to some minds. Not only do his therapeutic assertions hinge very often on false clinical foundations, but his deductions are very often based upon pure hypotheses and assumptions. I will quote liberally from his most recent utterances.

Diday<sup>1</sup> accepts the microbial origin of syphilis, chiefly on analogical

<sup>1</sup> *La Pratique des Maladies vénériennes*, Paris, 1890, pp. 380 et seq.



grounds, for he concedes that the microbe has not at all been clearly demonstrated. A microbe being of vegetable origin, he ingeniously argues that when, as a pathological factor, it is deposited in the human tissues, it runs its course according to the law of vegetable life, in which are observed alternating periods of activity and of repose. He thus continues: "Now, the first attribute common to bodies of this order (for it is the condition of their development) consists in the two phases which alternately succeed each other: the one of repose—*latent life*; the other of activity—*manifest life*. Now, this is the character of syphilis, which from its commencement to its end is marked by a series of sleepings and wakings; that is to say, intermissions, then resumptions of manifest life; and resumptions to which medical language has justly given the name of *manifestations*. These manifestations in every plant mark the period in which it borrows from the surrounding media the elements necessary to its growth. It is therefore during this state, and it is only during this state, that there are established admissible exchanges between the media and the plant. Consequently, the media can act favorably or unfavorably upon the plant. The evolution of syphilis is strikingly intermittent. Does not this character, which is its distinctive sign, indicate a state equally intermittent in the vitality of the vegetable organism presumed to be its cause? This demonstrated, the law applies itself most naturally to our pathogenic microphytes. Our organism is the habitat of these parasites, their feeding-ground, their field of battle and of strife against the defensive forces of our living tissues." He then goes on to say that if these organisms overwhelm us, we must try to exterminate them. "If we wish that our tissues (terrain) shall cause their death, we must prepare them to that end the moment they show signs of life. Since we cannot by means of the soil (living tissues) attack the microbe, we must wait until it begins to increase and multiply. It is a benefit of nature that at the time when the microbe becomes pathogenic it is particularly accessible to our means of attack. The principle of this therapeutic system consists in waiting in the employment of specifics until the evidence of manifestations, and after a study of their clinical physiognomy we can first seize the moment when the pathogenic agent awakes and is at the minimum of its resistance; and, second, settle in our minds the nature, the doses, and the duration of the medication necessary to oppose it." Lancereaux laconically sums up Diday's system as follows: "When there is a lesion, intervention; in the intervals, expectation."

It may be remarked that it seems almost foolhardy for a man to base a system of therapeutics upon a simple hypothesis, and yet this is what Diday has done, supporting it with far-fetched analogy and a pure and simple assumption of the behavior of the various syphilitic processes. What evidence have we that the cells of syphilis behave in the tissues of man as do the seeds of the vegetables in the fields? The one process is pathological, the other normal, the latter depending very much for its development upon cyclical changes of time and season, the former upon the various unknown conditions of the disease and numerous complex conditions of the human system.

If any one wishes to get a good idea of the expectant or opportunistic system of treating syphilis, let him study the disease in dispensaries, clinics, and hospitals. Patients who are treated in those institutions as a

rule do not apply until more or less urgent manifestations and symptoms begin to trouble them. In general, they merely get patched up, for they only remain as long as their immediate trouble is present and urgent. Then off they go, to return later on with new and perhaps worse manifestations, no medicine having been taken in the mean time. Then, again, let any man who sees in his practice many cases of syphilis watch those who follow treatment regularly and carefully, and compare their condition with that of patients who are careless and only apply for relief in times of urgency, and he will find that the *laissez-aller* cases are the ones which as a rule do badly. However, let me allow the younger Zeissl<sup>1</sup> to speak for himself, and he but voices the tenets of his deceased father. In his most recent paper he says: "When syphilis is treated expectantly—that is, when an antisypilitic remedy is not given to the patient after the first secondary symptoms—the eruption requires, on an average, a period of two to eight months for its disappearance, while the initial sclerosis requires at least four months, oftener five or more, for its involution. Defluvium capillorum and enlargement of the ganglia often remained noticeable for a year; with the return of the growth of the hair the symptoms successively disappeared. Zeissl (senior) very rarely observed any relapses, especially of a severe kind, when purely expectant treatment was continued until complete disappearance of the syphilitic symptoms. We can confirm the observation from our own experience." He further states that if patients in private practice demanded rapid relief from disfiguring cutaneous affections, mercury was given to them. It seems to me that to pursue a system like the one thus called opportunistic, which can but expose the patient to trouble, danger, and disaster, is almost criminal. It has always seemed to me that this treatment, based on fantasies and assumptions, is founded upon a hopeless view of the possibility of curing syphilis, and upon a fear that the active use of mercury will be productive of harm. I can well understand why the elder Zeissl (as is reported) recklessly said that if a man once had syphilis, his ghost would be syphilitic. His idea of the treatment of syphilis would certainly warrant that belief. The expectant or opportunistic system of treatment is utterly unscientific and perniciously dangerous, and it is well for humanity that it is growing into disfavor, disrepute, and disuse.

*Continuous or "Tonic" Treatment.*—The continuous or so-called tonic treatment of syphilis is in reality only a modification of Fournier's system of treatment, amplified by considerable theoretical elaboration. It has had as its champion in England, Mr. Jonathan Hutchinson,<sup>2</sup> who may be said to be the pioneer in the doctrine of long-continued mercurialization in syphilis. In this country my friend Dr. Keyes<sup>3</sup> has long been a believer in its efficacy, and he is the sponsor for a system of medication which he terms "the tonic treatment of syphilis." The therapeutical agent employed in this scheme of treatment is the protoiodide of mercury (Hutchinson uses gray powder), which is to be given without cessation for two or more years. Here is the system in the author's words: "Sup-

<sup>1</sup> "Die Gegenwärtige Stand der Syphilis-therapie," *Klin. Zeit und Streitfragen*, 1887, p. 160.

<sup>2</sup> "When and How to Use Mercury in Syphilis," address before the Hunterian Society of London, January 8, 1874.

<sup>3</sup> *The Tonic Treatment of Syphilis*, New York, 1877.

posing that the centigramme granule (protoiodide of mercury gr.  $\frac{1}{6}$ ) has been selected as the medicine to be used, the instructions to the patient are as follows: Take one granule immediately after each meal (*i. e.* three times a day) during three days. On the fourth day add one granule to the midday dose, taking one in the morning, two at noon, one at night. Continue this during three days. Again, on the fourth day add one granule—two in the morning and at noon, and one at night. Continue this for three days, and again on the fourth add a granule. Continue in this manner, being very careful as to food, drink, exposure, etc., until there is very positive evidence of irritation in the intestine, such as colicky pains with positive diarrhoea, or until the gums begin to show signs of being slightly touched.

“The daily amount now taken is known to be the patient’s dose of the given preparation of mercury, beyond which he cannot go without aid from opiates, and of which, if long maintained, the effect upon the general health will be certainly damaging.

“The amount, whatever it may be, I call the full dose in contradistinction to his ‘tonic dose.’

“It is impossible to find what the full dose of a patient is except by experiment. The ‘full dose’ being ascertained, it may be continued by the aid of opiates and unirritating food until the eruptions or the syphilitic symptoms, whatever they may be, are overcome. As soon, then, as the active symptoms have yielded the patient’s dose is reduced one-half, and this half dose, which will act as a tonic (I call it the ‘tonic dose’), is to be continued unceasingly day after day, month after month, waiting for new symptoms. Should such symptoms appear (there may be none whatever except throat and mouth lesions), the half dose held in reserve (I call it the ‘reserve dose’) may be at once added to the ‘tonic dose,’ and the ‘full dose’ continued until the symptoms yield, after which the ‘tonic dose’ is to be again resumed.”

I have never been an advocate of this scheme of treating syphilis. It has always appeared to me that the system is very thoroughly pervaded with theory and built upon confusing arithmetical problems. It assumes to gauge the therapeutic power of mercury by the state of the gums and of the intestines of patients taking the drug for syphilis. I do not consider these buccal or intestinal criteria of such importance or of such reliability that they should be the guiding-points in medicinal treatment. In most cases salivation can be prevented by scrupulous care of the mouth, and the patient put in such a condition that he can stand large doses of mercury, whereas while he had his buccal infirmity he suffered from sore mouth from very minute doses. So that, as a broad general rule, it may be said that the state of the mouth is not an index as to the amount of mercury the patient can take or as to its therapeutic effect on the disease. Moreover, the condition of the intestines is not in any sense a reliable guide in the treatment of syphilis. The mercurial taken by the stomach may cause mild or severe gastro-enteritis and have no effect upon the syphilis, and the believer in this doctrine might then think that he was at the end of his tether—that he had gauged the patient’s dose and found it irritating and inefficacious. Now, let that man leave the patient’s stomach alone, and administer to him hypodermic injections of mercurials or inunctions of mercurial ointment, and he will generally find that with



careful management the symptoms and lesions will be made to yield without untoward effects, though he may be a little wavering in his mind as to the arithmetical quantity of mercury he has given that patient. In this case certainly the intestines are not good guides.

Then, again, a man who pins his faith on one remedy and one form of pill in the treatment of syphilis is like a man who attempts to run with a chain and ball attached to his leg. The treatment of syphilis is far from being a matter of routine or a mere problem of dose-arithmetic. To be thorough and successful, as I have said before, it must be based on broad principles, upon an accurate and full knowledge of the disease, and upon frequent and thorough study and observation of the patient. In the course of syphilis many conditions, exigencies, and complications are apt to arise, and the physician to be successful in its cure must be ready with all known modifications and expedients of treatment. I would ask what latitude a surgeon has in the treatment of syphilis with only protoiodide-of-mercury granules, pellets, or pills at his command? In what condition is he to cope with unusual features, exigencies, or complications?

Furthermore, the fatal shortcoming of this treatment resides in the mercurial preparation itself. Though much vaunted years ago in the therapeutics of syphilis, the protoiodide of mercury has, after years of trial by many syphilographers, been found to have only a certain scope and very many limitations. It is a very excellent preparation within certain limits, but beyond them it is feeble or even inert. I have used this remedy for more than twenty years, and to-day, after careful study and observation, I am led to place little value upon its efficacy in the treatment of syphilis after the lapse of the first few months. In early secondary syphilis it may be used with decided benefit, but later on in the vast majority of cases it will be found wanting, and can be replaced with benefit by other mercurial compounds taken by the mouth or by other methods of administering mercury.

Finally, the unremitting use of the drug has its disadvantages, its drawbacks, and its dangers. We find some patients who, having a mild form of syphilis, keep on taking the protoiodide for long periods for the reason that it is easily taken. Some people can take mercury for years, and seemingly be unaffected injuriously. The drug seems to stimulate their portal system, and takes the place of saline laxatives. I very much doubt whether the mercury in many of these cases is at all absorbed into the circulation. The continuous use of mercury by stomach ingestion induces a condition of tolerance, and after a time it ceases to be a therapeutic agent, or has no effect—certainly none that is beneficial. For many years I have seen patients who have come of their own accord, or have been sent by physicians, who have been treated continuously and without any intermission whatever for two or more years with mercury, and who still have some syphilitic lesion which refuses to disappear—perhaps dermal, osseous, or articular, or even cerebro-spinal, ocular, or visceral. These patients, and very often their physicians, cannot understand why it is that a treatment so constant and seemingly energetic, and in most cases so conscientiously administered, should be productive of such unsatisfactory results.

The answer is clear and simple. They have used mercury in a weak and impotent manner in the early days of syphilis, and have continued its use long after it had ceased to have any therapeutic effect—long after it

had lost its influence, when given by stomach ingestion, over the syphilitic diathesis. Strange to say, some of these patients had escaped without serious injury, but in others the chances of cure had been materially jeopardized or rendered more remote. In very many cases this incessant mercurial treatment is productive of very bad results. I have seen most distressing instances of neurasthenia and a general undermining of the constitution, which predisposed the patient to such grave disorders as pneumonia, phthisis, erysipelas, etc., which were undoubtedly due to the debilitating influences of a long-continued mercurial treatment, which greatly defibrinizes the blood and weakens the tissues. Dilatation of the stomach (Jullien) and a low grade, or even a severe and ulcerative form, of enteritis, have (Overbeck, Heilbronn, and Mehring) been known to be caused by these continuous mercurial courses. Thus given, mercury does not cure the syphilis, which may slumber or may break forth, but it induces a low grade of health, which is fraught with trouble, danger, and disaster to the patient. I scarcely know of a more difficult task than that of curing an old syphilitic who presents more or less distressing or dangerous lesions for which he has undergone an attenuated, low grade, and prolonged mercurial medication, which kept him on the ragged edge and failed to dislodge his enemy. I have seen, during many years of careful observation, so much trouble, suffering, misery, and even disaster, result from this method of treatment that I feel it my duty to raise my voice against it as being unscientific, irrational, and mischievous, and a perversion of one of the greatest therapeutic blessings which we possess. It is gratifying to note that among advanced syphilographers there are very few indeed who advocate chronic continuous mercurialization. This fact has been well shown in all of the discussions at the recent great congresses of Medicine and Surgery.

*The Interrupted Treatment of Syphilis.*—The method of successive treatments or the interrupted treatment of syphilis was proposed by Fournier<sup>1</sup> in 1872, and was the outcome of a reaction against the short and vigorous six months' mercury and three months' iodide of potassium treatment which had been introduced by Ricord, which with certain minor modifications was followed by most French surgeons of those times, though some of them were contented with a three months' course. Fournier says: "I am fully satisfied of the truth expressed by Chomel, that the duration of the treatment is more important than large doses. It is a hundred times better to treat a patient for a long time with sufficient doses of mercury than within a short time to give him large doses. This point, however, is scarcely open to dispute, for it is certain that in order to derive all the good which mercury can give, and to avail ourselves of its curative influence for the future, it is necessary to administer it for a longer time than is generally laid down." Fournier recognizes that when given over long periods mercury loses its efficacy, and says: "It is the same with mercury as with other remedies: its continuous use induces a condition of tolerance which lessens and finally destroys its therapeutical effect. Now, what interpretation more simple or rational can be given to the fact, which every observer has seen many times, than that a certain dose of mercury, having exerted an

<sup>1</sup> *Leçons cliniques sur la Syphilis, étudiée plus particulièrement chez la Femme*, Paris, 1881, pp. 782 et seq.

influence on the disease for a certain time, beyond that has lost its influence because the organism has become *habituated to it?*" He therefore advised, in 1872, that over a period of two years mercury should be given for a time, and that then it should be stopped for a certain time, during which the patient becomes unaccustomed to the remedy. By so doing, he says, "I should preserve the peculiar intensity of action of the mercury during the whole period of treatment."

He then continues: "The second intention of this method is to confer upon patients the advantages of a long-continued treatment, and this method is better adapted than any other to this essential indication. In fact, it enables patients to be treated for a long time without wearying them, and to take for as long a period as may be necessary a remedy which, if continuously administered, would not be long either in being not tolerated or in losing its curative action."

Fournier's method of treatment, concisely stated, is as follows: He begins by administering from three-quarters to one and a half grains of the protoiodide daily in divided doses. In three or four weeks the eruption will in all probability have disappeared. The treatment, however, is prolonged for two months. (That is, the patient is put under treatment in the primary stage and mercury is given for eight weeks.) Fournier then says: "After that, what shall I do? After that, *whatever may happen* (bear this well in mind), I would suspend treatment, being very certain from experience that my patient will have already become accustomed to the mercury, of which continued doses would only have a relatively small effect. I would leave him without treatment for several weeks; to be more definite, at least a month. That time having elapsed (understand this well also), I would recommence the treatment, whatever might have happened; whether the patient has or has not had new lesions, he would be none the less syphilitic nor less liable to the manifestations which it is my desire to prevent." The renewed treatment should last six weeks or two months, and then a respite of three months is granted. Then mercury is given again for six, seven, or eight weeks. Then a suspension of several months, until at the end of two years a patient has taken mercury for ten months, and has at intervals been without it for fourteen months. This treatment, introduced in 1872, has been adopted by many, and has been attacked violently by a few, notably by Diday, against whose therapeutics Fournier directed much incisive logic and many facts. It evidently has not fulfilled the expectation of its originator, for we find that within a few years Fournier<sup>1</sup> writes: "Syphilis is an infectious chronic constitutional disease, diathetic like gout and scrofula, and should have a lifelong treatment." So in 1889 he says that in the third year there should be four courses of six weeks each with respites of equal length, and that iodide of potassium should be taken. In the fourth year four similar courses of six weeks' duration, and in the fifth year three courses. We also find that Martineau advocated a five years' course, while Besnier says that it should be indefinite, and Leloir has recently put forward a system of treatment of four or five years' duration. Indeed, there seems to be in France a prevailing belief among many

<sup>1</sup> "Direction générale du Traitement de la Syphilis," *Gazette des Hôpitaux*, Nos. 103 and 107, 1889.



that syphilis is an incurable disease, such a statement being the keynote to a series of clinical lectures by Denis-Dumont, published in 1880.<sup>1</sup>

For many years I was an advocate of the plan proposed by Fournier for the treatment of syphilis, and I had the pleasure of first presenting his views in the English tongue.<sup>2</sup> But as years went on I found that although the general plan is an excellent one, the treatment as a whole is very defective. The objections to it are mainly those which I have detailed in the section on the continuous treatment by mercury, which is really only Fournier's treatment kept up without cessation, and is even more defective and inefficacious than the latter.

As a general working plan, however, Fournier's system has much to commend it, though I am free to say that I can only condemn its essential feature—the protoiodide of mercury as the therapeutic *pièce de résistance* and the general arrangement of treatment in the primary and early secondary stages. For very many years I have studied this question carefully and conscientiously, having at my command a vast clinical field; and in the light of knowledge already gained, and of what I learned from my successes and my failures, I have arrived at conclusions which embody, I venture to think, a most effective and practical system of treating syphilis—one which in the great majority of cases will eradicate or suppress the disease and restore its victim to health. In this treatment there is nothing particularly new and startling, and in its essential points I have the support of many of the ablest Continental authorities. My observation from year to year has thoroughly convinced me that the current emasculated, theoretical systems of treating syphilis are dire failures, and bring very many patients to discomfort, suffering, disaster, invalidism, and death. While some may get through by reason of some lucky chance, I feel very certain that a man in the long run will have a far better chance to be cured of his syphilis by the old-time vigorous six-months' mercury and three-months' iodide treatment than he will by the long-spun-out, attenuated courses which have as a watchword the phrase pregnant with ignorance and complaisant indifference, that time and mercury will cure or wear out syphilis.

*The General Methodical Treatment of Syphilis.*—We have already seen that, for very cogent reasons, it is best to wait until the onset of the secondary period before beginning a general antisypilitic treatment. If the patient is under observation during the course of the chancre, much can be done for him in advance by the surgeon. At this time he can be prepared, if necessary, for the coming ordeal by a preparatory tonic course, or, if there are indications of gastro-intestinal impairment or debility, measures to remedy them may be instituted. Then, again, in this period, if there are very much swollen lymphatics or ganglia (and they will be found in association with the chancre), a well-directed external regional treatment may be followed. To this end mercurial plasters, such as emplastrum de Vigo, or Unna's and Quinquaud's plasters, or simple mercurial ointment, may be used. This regional treatment will have no perceptible effect upon the general deepening of the infection. At this time

<sup>1</sup> *De la Syphilis: unité d'origine; incurabilité; traitement*, Paris, 1880.

<sup>2</sup> "On the Treatment of Syphilis," by Alfred Fournier, M. D., translated by R. W. Taylor, M. D., *New York Med. Journal*, Aug. and Sept., 1872.

also the condition of the mouth, gums, teeth, and pharynx should be inquired into, and these parts should be put as nearly as possible into a condition of health.

Before putting a patient upon general antisymphilitic treatment it is well for the physician to place before him certain facts as to his condition and his duties, and to forecast for him, as far as possible or prudent, his future pathological balance-sheet, so that he may know clearly what he has to do, what he has to fear, and what he may expect. With the onset of secondary syphilis a most important and eventful epoch in the life of the patient begins, and much can be done for him by a little kindness and common sense. The physician must impress upon the patient the fact of the gravity of his disease and prepare him for the ordeal which is in store for him. He must be made to understand, in a gentle, kindly manner, that the ensuing two years at least are the most critically momentous ones in his whole life, and that his future health and happiness, and those of his family, depend upon his care of himself during this trying epoch. It is cruel and unnecessary to paint a dismal and lugubrious picture to these patients, or by word or manner to depress or discourage them. We are in the position, thanks to our advanced therapeutics, to speak encouragingly and even brightly of their future, and to hold out to them the assurance that the ordeal of treatment will not be irksome or painful, and that a future cure is in store for them. We can tell our patients truthfully that two or two and a half years of careful, methodical, watchful treatment are, if they will conform to its regulations, sufficient to cure them of their disease. As a result of the treatment they will see the syphilitic lesions cease and fail to return, they will enter into a period of health in which there are no signs whatever of syphilis about them, and they will thus remain and will possess the power of procreating healthy children. The requirements for this gratifying state and for this future immunity are a fairly good state of health previous to infection, the docility and loyalty of the patient to his physician, and a treatment begun sufficiently early and carried out in a watchful, thorough manner. This is the tripod upon which his future happiness rests. In the treatment of syphilis the duties of the physician and patient are reciprocal. While, therefore, in the majority of cases, particularly those of the intelligent and well-to-do classes, we are warranted in giving a hopeful and satisfactory prognosis, there are cases in which, under the best of circumstances, the progress toward cure is slow, often disappointing and halting, and attended with much suffering, discomfort, debility, and illness. But even in these cases, trying and often discouraging alike to the patient and the physician, there is usually no necessity for doubt or despair, since with the rich therapeutic armamentarium at our command we are enabled to adapt ourselves to urgent necessities, exigencies, and emergencies, and even to cope with formidable crises. In his early interviews with a syphilitic patient it is the duty of the physician to make a careful study of the man, to acquaint himself with his temperament, his standard of health and vitality, his greater or less power of resistance to disease and bodily strain—in fact, his mental and physical stamina, modes of life, tendencies, habits, surroundings, and his duties, obligations, cares, and responsibilities—since from such a study much valuable knowledge is gained.

It must always be remembered that weakly, cachectic persons of poor

fibre; flabby subjects; those who may be classed generally as underweight individuals; persons of very light and sandy complexion; those suffering from rheumatic, gouty, tuberculous, neurotic, malarious, or other adynamic conditions or influences; those having visceral disease of any kind or any inherited or acquired morbid tendency; and particularly persons addicted to alcoholic indulgences,—are liable to suffer more or less severely from syphilis, and that in such cases the prognosis is less favorable and a longer time for cure may be required.

Besides its lesions proper, syphilis tends in many cases to produce in the economy anæmia, cachexia, and even a condition of marasmus. Though there are some patients in whom it does not produce debility, and who, despite their disease, seem as well as they ever were, we must always be on the lookout for its depressing effects upon the system. Therefore the first rule to be laid down in the treatment of syphilis is that the hygiene, regimen, and surroundings of the patient shall be made as nearly as possible perfect. The diet must be simple, ample, and nourishing, and the patient's habits as to eating, drinking, and sleeping should be regular and systematic. All health-giving sources of recreation and exercise should be made use of, and every attention should be given to maintaining the health and vitality of the patient at as high a plane as possible. Therefore patients must be warned against overtaxing themselves physically or mentally, or in any way putting themselves on a strain. The physician should always be watchful, particularly in the treatment of patients of the higher classes, about the mental wear and tear that so many are liable to. In such cases syphilis is very prone to produce cerebral and mental disturbances.

While in general abstinence from alcoholic drinks is to be recommended for syphilitic patients, it is always well to exercise wholesome common sense in dealing with this question. Many authors go to an extreme in considering that syphilitics should become prohibitionists. The ordeal of the syphilitic is not, as a rule, a very happy one, and the less we surround him with irritating restrictions the more docile will he be in the long run in following treatment. Therefore I think that a man who by habit partakes moderately of claret or burgundy or other mild stimulant at his chief meal, and who enjoys it and is seemingly none the worse for it, should not generally be deprived of it. Then, again, there are patients who partake in moderation of ale and beer, and who are to their thinking benefited thereby. Provided these stimulants do not disorder the stomach, they can hardly be called deleterious; therefore their use should not be abruptly interdicted. On the other hand, indulgence in strong alcoholic drinks and champagnes must be peremptorily stopped. Nothing is more galling to patients, according to my experience, than a treadmill treatment which surrounds them with all sorts of restrictions and imposes upon them blue-law abstinence. The plan which works best in the long run in handling syphilitics is that which, compatible with their well-being, gives them most latitude and revolutionizes their habits and modes of life as little as possible. To sum up, alcohol should only be used by syphilitic patients in great moderation and under conditions which tend to improve their strength and digestion.

It is almost unnecessary to say that excessive sexual indulgences are depressing and exhausting and that they are to be wholly avoided. Very



many cases of cerebral and nervous syphilis have their origin in sexual excess, and many men have become infirm or have perished from such over-indulgence while in the power of syphilis. As to tobacco, we can hardly speak with the same latitude and tolerance as we can of alcoholics in syphilis. Smoking and chewing, even in mild indulgence, are so prone to induce irritation and inflammation of the mouth and throat, parts which it is so vitally necessary to keep in a high state of health, that we are forced, as a rule, absolutely to prohibit them. It requires, very often, considerable moral courage to deny the touching appeal of a patient to be allowed one or two cigars a day, but we must in general stand firm. Still, there are cases, happily for them, in which, despite syphilis and its treatment, irritation of the mouth and throat does not exist, and such patients may perhaps, under observation, indulge in their favorite habit. Wherever the use of tobacco produces even mild hyperæmia of the mouth and throat it should be firmly forbidden.

All functional derangements or affections of internal organs, stomach, intestines, liver, spleen, kidneys, etc., should be carefully attended to. Patients prone to pulmonary affections, and those having a tendency to rheumatism and gout, should be warned in advance to observe very great care in the avoidance of the causes which are liable to light up or develop these dormant tendencies. In like manner, neuropathic subjects, and those suffering from any hereditary or acquired cerebral or nervous trouble, should be carefully but impressively made to understand that the nervous system is their weak part, and that while they are in the grip of syphilis they must be more than ordinarily careful not to overtax it or to abuse it.

It is very important that the changes of the season and weather should be accompanied with appropriate clothing, and that the utmost precaution should be taken against catching cold.

While the physician should thus impress his patient with the gravity of his condition, he should also constantly hold out to him that most consoling hope, that he will, in all probability, in the end be free from his disease. While some patients are calm and sensible, and others light-hearted and indifferent to their physical condition, others, again—happily not many—show a tendency to worry, fret, and solicitude, or even to a depression of spirits and melancholy which is termed syphilophobia—a most distressing state of mind both for the patient and his physician. Such cases should be treated with constant encouragement and kindness mingled with firmness; their doubts should be dispelled, their fears should be allayed, and bright hopes should be held out to them. By such a course many a rough spot will be made smooth, and many a man will be auspiciously brought through his syphilis who otherwise would have faltered or have fallen by the wayside.

With the onset of the generalized manifestations of syphilis at the beginning of the secondary period the regular methodical treatment should be commenced. At this time and at short intervals thereafter the patient must be carefully examined as to the condition of his skin and its appendages, of his mouth and throat, and lymphatic system generally. Taking for an example a case of roseola with its usual concomitants of slight fever, malaise, and perhaps nocturnal headaches or rheumatoid pains, we should immediately put the patient, as a general rule, upon treatment by the mouth. Later on the inunction method may be employed, but as a

rule pills are quite effective, particularly in the very early secondary stage. While intelligent patients will usually submit gracefully to inunction treatment later on, its adoption at the very outset is apt to be irksome, and to give them the idea that they have a very trying and unpleasant ordeal before them. Though many preparations of mercury are employed, my preference is for the protoiodide and the tannate when the drug is given in pill-form. Calomel and blue pill are usually not satisfactory agents. Calomel is very apt to salivate promptly, and its action is far from certain; and as to blue pill, it may be said that when given in small doses it does nothing for syphilis, though it may act upon the liver, and when it is given in sufficient quantity one never knows how soon severe salivation may be induced. Bichloride of mercury is given by some physicians in pill-form, and is the active ingredient in the Dupuytren pills so much used in France, but it is very apt to produce pain in the chest and bowels and gastro-intestinal irritation. Then, again, its action cannot be relied upon, for in small doses by the stomach it does little if any good, and in large doses it is very irritating. Its action when used hypodermically is, however, very efficient and satisfactory, and its local action in lotions and ointments is very prompt and beneficial. Within recent years the carbolate, salicylate, thymolate, alanilate, and other preparations of mercury have been vaunted as possessing marked potentiality, but when put to the test they give evidence of possessing no advantage over the drugs I have named. In the section of this chapter upon hypodermic injections all the new compounds are treated of.

Since every case of syphilis is a law unto itself as to the amount of mercury which will be required for its cure, we can only state the doses approximately. For an adult, male or female, a quarter or a third of a grain of the protoiodide of mercury may be given at a dose, of which three a day will be sufficient. Very large and robust persons may require one half of a grain at a dose. These are always good doses to begin with, and by them the tolerance of the drug may be gauged and its remedial action estimated. I have elsewhere in this chapter called attention to the very minute doses of the drug given by some physicians, but it is appropriate to repeat here that the one-fifths and one-sixths of a grain of the mercurial preparation recommended by some are utterly useless for the cure of syphilis.

In the early secondary stage there are certain conditions favorable to an active treatment—namely, a system virgin to mercurial action and a greater susceptibility of the lesions to the action of mercury. This, then, is the most favorable time for efficient treatment, and it is the most critical one in the life of the syphilitic, for if the disease is actively attacked then, its backbone may be broken. It is very probable that much of the late rebelliousness and malignity of syphilis is due to the fact that the newly-formed infecting granulation-cells and the concomitant subacute inflammation induce in organs and tissues, particularly delicate ones, structural and nutritive changes which predispose them to subsequent low grades of inflammation and cell-increase; besides, to a repetition of the essential syphilitic process. Therefore every effort should be made to destroy these young infectious cells, and to remove them as quickly as possible from the parenchyma of organs and tissues, before they shall have had time to induce these

subtle and dangerous structural changes. In proportion as a systematic and vigorous mercurial course is entered upon late, so it is more and more heavily weighted in its action. There is no doubt whatever in my mind that a mercurial treatment covering the first six months of the disease is far more salutary and effective than a course extending over a year and more, instituted later on.

It is important, therefore, that the initial course should be active and prolonged, and in attaining this end the case must be carefully handled and watched. As a rule, the physician can form a correct estimate as to the probable effect of mercury upon his patient within a week or ten days. Having put the stomach and intestinal canal in normal condition, and the mouth and throat having received proper attention (see section on Stomach Ingestion), the dose of the mercurial may be increased within a few days to one grain or one grain and a half, and even to a larger quantity. It is rarely necessary to give more than three grains of the protoiodide in a day, and most cases will do well with about two grains, or even less. The tannate of mercury is a very active drug, which from a large experience I have come to place much confidence in. It is not as mild as it has been claimed to be, and cannot (as has been implied) be used with impunity. In some cases it causes gastro-intestinal irritation, and in my early days of its trial I saw several cases of prompt and severe salivation. Its initial dose is best fixed at one half a grain, instead of a grain, as recommended by some. Brousse and Gay<sup>1</sup> have recently introduced the gallate of mercury into the therapeutics of syphilis. They consider this salt more stable and of more definite composition than the tannate of mercury. The gallate is said to be a very active agent, causing secondary lesions to rapidly disappear. It does not disagree with the stomach and bowels or cause stomatitis. It is rapidly absorbed. The gallate of mercury is of a greenish-black color and contains nearly 38 per cent. of the metallic base. It is given in pill form combined with quinine. The dose is 10 to 20 centigrammes daily.

In combination with the mercurial preparation we may employ a ferruginous or bitter tonic, and as an adjuvant we may add a sedative agent to calm the intestinal canal. I think a note of warning should be raised against the combination of preparations of opium in antisymphilitic remedies. There is really no need for them, and much harm may be done by their continued use in producing an habituation to the drug, with all its deleterious effects upon the nervous system, the digestive organs, and the tissues generally. We can never determine the exact condition of a patient under mercurial treatment who is also under the influence of opium. As a general rule, in stomach ingestion mercury, if carefully given, causes little trouble. It may produce diarrhœa and colicky pains for a day or two, which a little essence of ginger or peppermint will relieve, or it may be necessary to omit one or two or more doses. In general, if patients are careful about their food and do not take too much fluid into their stomachs, the mercurial will after the first disturbance cause no irritation.

The following formulæ may be used :

<sup>1</sup> "Sur le Gallate de Mercure, nouvelle preparation antisymphilitique," *Journal des Malad. Cutan. et Syphilit.*, Aug., 1893, pp. 471 et seq.



R. Hydrargyri protoiodidi,	gr. viij to x ;
Ferri et quinin. citrat.,	ʒiiss ;
Ext. hyoscyami,	gr. vj.—M.
Ft. pil. xxx.	

R. Hydrargyri tannici,	gr. xv to xxx ;
Quinin. sulph.,	ʒj ;
Ext. hyoscyami,	gr. vj.—M.
Ft. pil. xxx.	

The protoiodide may also be used in the form of tablets, and the tannate is put up in gelatin-coated pills. As I have said elsewhere, the protoiodide of mercury is a rather feeble preparation, and its use is most effective in the early months of syphilis, though in later periods it may be employed if we desire a mild mercurial action. When we administer it in the initial course of treatment we must watch its effects very carefully, otherwise we may waste most valuable time. I am firmly convinced, from ample experience and conversations with physicians, that since the adoption of the long mercurial courses with minute doses an easy-going, happy-go-lucky feeling has taken hold of many of them in the treatment of syphilis. They are told, in some of the books and at some colleges, that with doses of fifths and sixths of a grain of the mercurial salt syphilis may be cured in two or three years, and this, practically, is the extent of their therapeutic armamentarium. This teaching, I know, has engendered a feeling of false confidence and security and a tendency to superficial and dangerous routine. The physician complacently satisfies himself that his arithmetical dose is all right, and he contents himself with the thought that time and mercury will wear out syphilis, and that all will be well in the end. Under these conditions the patient is largely lost sight of, and the abstract problem—syphilis—is uppermost in the physician's mind. The cure of syphilis can be accomplished only by constant care and watchfulness on the part of the physician, who should feel his way, should push his remedy cautiously, and keep it so well in hand that he will get all of its good effects and avoid all drawbacks and harm which may arise if they are not looked out for.

The criteria which indicate that our treatment is correct and efficient should be carefully studied. If the patient looks and feels well, sleeps soundly, eats heartily, holds his accustomed weight, and is mentally and physically in a satisfactory condition, there is strong evidence that he is being benefited. But we must further assure ourselves that the lesions are being acted upon. The indurated nodule must have wholly disappeared, the lymphatic engorgement must show evident signs of involution, and the rash must have faded. The throat and mouth must be inspected very often, and any red patches or ulcerative lesions must be actively treated. It is always a good rule as the rash is declining to discontinue the pills and to give the patient one or two courses of mercurial inunctions (see section on Inunctions), by which the whole surface of the body will be acted upon by mercury. In this way any infectious cells which may be left over from a local or general rash may be acted upon and destroyed. Even while the patient is taking pills mercurial ointment may be used

locally upon the lymphatic ganglia, due care being taken that an overdose be not given. In like manner papular and pustular lesions in hairy parts should be treated locally. The physician should always remember that all syphilitic lesions, even the most minute, are to be feared as possible sources of continuous or intermittent reinfection of the system. The morbid cells contained in these lesions are capable of great, even infinite, multiplication, and the so-called syphilitic relapses are due to the recurrence of these cell-proliferations, which develop from morbid foci left over at an earlier date. Painful spots and swellings upon bones or near or at joints, thickening of the fasciæ and subcutaneous connective tissues, should receive regional treatment. In like manner, in cases of headaches, neuralgias, rheumatoid pains of muscles, eye and ear affections, affections of the hairs and nails, the mercurial action should be brought as near as possible to the morbid area. It is also advisable to watch for and act promptly upon red scaling patches and papules seated upon the palms and the soles, since they are very persistent. Any swellings and hyperplasiæ about the mouth or face, vulva, anus, and scrotum should receive careful local treatment. As time passes, in some cases it will be seen that even with full doses internal mercurial medication is feeble and more or less ineffective. If the case is carefully watched, this will be promptly discovered, and the patient may be put upon inunctions, fumigations, or hypodermic injections. It is a good rule never to be content with the action of mercurial pills unless we see a decidedly rapid subsidence of the lymphatic ganglia. It must not be forgotten that the action of the protoiodide, the tannate, and other mercurial preparations grows less pronounced as time goes on and the infecting cells become more stable and hardy. This fact being evident, it is necessary to substitute another method of administering mercury.

Our aim should be to keep up a continuous mercurial action during from four to six months after the onset of the secondary stage. In general, this can be done without experiencing any serious drawbacks if the case be properly watched. There may be periods of a few days in which it is necessary to suspend medicine and either leave the stomach at rest or give tonics. But, as a rule, this early period offers us our golden opportunity, and we should always avail ourselves of the then existing favorable condition of the stomach and the system to assimilate mercury. In somewhat rare cases mercury taken by the stomach acts as a general depressant and the patient's nutrition is impaired. I have many times seen these grave drawbacks and seeming contraindications promptly dispelled by the employment of hypodermic injections of the bichloride of mercury. In such cases it is well to begin with a moderate dose, and then work upward as fast as we can.

During this initial active and energetic course we must take especial care of the patient's nutrition and be watchful of his well-being. If possible, change of air and scene at the seaside or the mountains should be enjoyed, and as much recreation indulged in as possible. The lighter the patient's cares and the less burdensome his condition of life, the more auspicious will his progress be toward cure.

While a patient is undergoing this mercurial course he should have one or two warm baths each week on going to bed, in order to produce diaphoresis. When practicable he should take Turkish baths, without

the cold plunge, and after them should be made to sweat freely. At the seaside cold salt-water baths are very beneficial, and an occasional hot sea-water bath, followed by packing and a sweat, is a valuable adjunct to mercurial treatment.

In cases, particularly uncomplicated ones, well treated from the beginning there are usually no perceptible secondary or tertiary stages. The secondary stage is entered upon, the disease is systematically attacked, and, excepting, perhaps, a few ephemeral and trifling manifestations upon the skin or mucous membrane (and they are largely produced by extraneous irritation, friction, coaptation of parts, want of cleanliness, smoking, etc.), he or she sees no further development. Still, some cases are rebellious, and tax our resources and patience, and some—happily few—go badly from the start.

Early in the secondary period in some cases it is necessary to resort to the use of iodide of potassium, sometimes alone and again in combination with mercury. As a rule, these cases are anomalous ones, in which certain lesions show a tendency to early and precocious development. The early onset of cerebral symptoms, some forms of headache, dementia, mania, epilepsy, hemiplegia, paraplegia, and aphasia call for the vigorous use of the iodide in combination with inunction-treatment, which should be used upon the neck and upper part of the body. The early supervision of osseous and articular lesions, the occurrence of epididymitis or orchitis, precocious affections of the ear and eye, and swelling of the spleen and liver should all be combated with a combined iodide and mercurial treatment. In like manner, the precocious development of cutaneous gummata and gummatous infiltration into mucous membranes (particularly of the mouth and pharynx) indicate the necessity of local mercurialization when practicable and the internal use of the iodide of potassium. With these exceptions the use of the iodide is absolutely to be condemned in early and secondary syphilis, for reasons given elsewhere. In some cases of rheumatoid pains and early rheumatism it may be necessary to use the iodide quite early.

It may be stated as a broad general rule that when cases come under treatment after the disease has existed for several months, they should be placed at once upon the inunction method. This course is particularly to be followed when the patient presents a more or less general eruption. In these cases we very often cannot bring sufficient mercury to act upon the surface of the skin through the medium of the blood-circulation, and it is a waste of time and effort to make the patient swallow pills. In all cases in which treatment is begun rather late the physician should be particularly careful to try, as far as possible, to exert a prompt and efficient influence upon the disease, and to keep up the treatment for (as a rule) six months without much interruption. In this way he may be able to make up for lost time, which, I cannot too often repeat, is so vitally valuable.

While in general the initial course of treatment, occupying six months if possible, should consist mainly of medication by the mouth or by inunction, the physician should be watchful of all complications and developments, should be on the lookout for all drawbacks and dangers, and should be ever prompt and ready with such modifications of treatment, such expedients, and such reserve resources of aid as the case may demand.



Having administered an efficient treatment, with few and short interruptions, for about six months, it is safe to say that in most cases, particularly uncomplicated ones, the patient will be well on his way to recovery. I have very many times seen patients who, for various reasons, had, many years before, undergone but one thorough mercurial course of six months, and who thereafter had been entirely well, had never shown any further evidence of syphilis, and who had procreated perfectly healthy children. Cases like these convinced me of the great efficacy of early thorough treatment, and I am glad to see that several eminent Continental authorities have reached the same conclusion. As I have said before (and the repetition is pardonable), a man's chances of being cured of syphilis are, in my judgment, a hundredfold better and surer by means of a single thorough early treatment of six months' duration than they are by the long-spun-out, ready-made, and emasculated method of small and continuous doses.

If the condition of the patient is satisfactory, as shown by the absence of all lesions, by almost entire subsidence of the lymphatic ganglia, by a good condition of his nutrition and strength, and by the absence of symptoms pointing to nervous depression and debility, at the end of six months he may have a rest, the moral effect of which will be very salutary. Patients very often weary of the long-continued dosing, and in the interval of repose they cease to consider themselves sick, and have an opportunity to judge of their condition when they are free from the effect of drugs. Therefore, a month's cessation of medication should be granted, and, if possible, the patient should go to the seaside or the mountains and have an entire change of air and scene. It is not uncommon, however, to see patients who do not desire a period of freedom from medication, but persist in carrying on the treatment.

According to the old-time Ricord plan of treatment, the six-months' mercurialization was followed by a three-months' course of iodide of potassium. Under proper conditions this course may be followed in those cases in which the patients are unusually anxious about themselves, and, as they usually express it, "do not want to lose valuable time." But in general my preference is to begin, after about a month's interval, a systematic inunction course. In cases in which this is impracticable or for any reason contraindicated, I have come to look with much favor and confidence upon a combination of a full dose of mercury with a small dose of the iodide of potassium. The following prescription will illustrate my meaning:

R. Hydrarg. biniodidi,	gr. ij to iv ;
Potassii iodidi,	ʒss ;
Tr. cinchonæ comp.,	ʒiiss ;
Aquæ,	ʒss.—M.

Sig. One teaspoonful three times a day, an hour after eating, in a wineglassful of water.

In this combination the mercurial is the efficient agent, and the iodide simply serves the purpose of rendering it soluble. When there is debility the fluid extract of coca may be added to this combination. As shown elsewhere, this agent is a very valuable adjuvant in the treatment of syphilis. From a wide experience I have convinced myself that this

combination of mercury and iodide of potassium is remarkably efficient and beneficial after the sixth or eighth month of the secondary period, particularly in cases which have been previously subjected to treatment. This combination is usually well borne by the stomach even when the maximum quantity of the biniodide is ordered. But great care must be observed in its administration, and if gastro-intestinal irritation is produced, the dose must be made smaller; and if a depressing effect upon the general nutrition or upon the nervous system is observed, the remedy must for a time be suspended. In these cases rest and change of air and scene are very beneficial.

The second course of treatment may be kept up, with or without slight interruptions, for three or four months, or even longer if the patient shows no signs of deterioration of health referable to the treatment. During this second course inunctions also may be used, with proper spaces of rest, or fumigations may be employed, according to the indications of the case. There may be circumstances present which render a course of hypodermic injections of sublimate preferable. In this way the first year passes, during which the patient will have been under dosage treatment nine or ten months.

Toward the end of the first year, if not before, combinations of mercury with iodide of potassium in quite large doses are very often most beneficial. The use of these combinations is generally known as the "mixed treatment." The following prescriptions are of much value:

R $\bar{y}$ . Hydrarg. biniodidi,	gr. j-ij ;
Potassii iodidi,	$\bar{z}$ <sub>ss</sub> - $\bar{z}$ j ;
Syr. aurantii cort.,	$\bar{z}$ ij ;
Aquæ,	$\bar{z}$ j.—M.

Sig. One teaspoonful three times a day, an hour after eating, in a wineglassful of water.

R $\bar{y}$ . Hydrarg. bichloridi,	gr. j-ij-ijj ;
Potassii iodidi,	$\bar{z}$ <sub>ss</sub> - $\bar{z}$ j- $\bar{z}$ iiss ;
Tr. cinchonæ comp.,	$\bar{z}$ iiss ;
Aquæ,	$\bar{z}$ <sub>ss</sub> .—M.

To be taken in the same manner as the foregoing.

The combination of the inunction-treatment with iodide of potassium taken internally is often very beneficial indeed, and should be remembered in late secondary and tertiary lesions, particularly when localized to certain regions, which should be acted upon directly by the mercurial ointment. The simultaneous employment of hypodermic injections of a mercurial salt with the ingestion of iodide of potassium is sometimes productive of prompt and marked benefit. As a general rule, the foregoing combinations are very useful toward the end of the first year of syphilis, but in many cases having an unusual course, and chiefly those in which late lesions appear precociously, it may be necessary to resort to them at an earlier date. It is always necessary to watch the condition of the stomach when the mixed treatment is being employed or when large doses of the iodide are administered. As soon as signs of gastric irritation show themselves the remedy must be suspended, and, if necessary, symptomatic

treatment should be adopted. The iodide alone or in combination may act as a depressant upon nutrition and upon the nervous system. In these cases it may be necessary to reduce the dose or to intermit the treatment.

Late secondary and tertiary lesions of the skin and mucous membrane, affections of the bones, periosteum, and joints, late-appearing affections of the eye, ear, and cerebro-spinal system, of the viscera, and of the testes and penis, require a combination or mixed treatment. In many cases it is necessary to increase the dose of the iodide far beyond those already mentioned.

It must be remembered that the arbitrary rule laid down by some authors, that early in syphilis mercury is indicated, and that later on the iodide alone should be given, is not, in general, a good one. Many a case of tertiary syphilis has remained unaffected by the use of the iodide alone, and has promptly improved and soon recovered after mercury also was given. The use of mercury, therefore, should not be limited to the secondary stage, but should also be employed in tertiary syphilis, either by inunction or hypodermic injection, combined with the iodide given internally.

It will be generally found that patients who have followed a systematic and thorough course of treatment during the first year very rarely present tertiary lesions. The cases which present these graver disorders are usually those which have been the subject of complications in the secondary stage, or those in which an early efficient treatment has not been followed or has been indifferently followed. Patients presenting tertiary lesions should be actively treated, but at the same time close attention must be paid to their general condition, for in many of them nutrition is impaired and a condition of cachexia exists.

In the carrying out of the methodical general treatment of syphilis in the second year of the disease the periods of dosage may, on an average, be stated at two to three months, with intervals of rest of a month or six weeks. In this way about eight months are occupied by actual medication. In most cases at the end of the second year of thorough treatment patients may be pronounced cured, provided they have not for many months shown evidence of the disease, that their lymphatic system appears healthy, and their general health and nutrition are good. Though there is a disposition on the part of those who rely chiefly on mouth-medication to extend the treatment of syphilis indefinitely, as I have already shown, I see no reason whatever for altering the opinion that I have many times stated, that if an energetic and thorough treatment (such as I have sketched) be followed for two years or two years and a half, the patient will be cured, as shown by the enjoyment of good health, by freedom from all syphilitic manifestations, and by his or her ability to procreate healthy children. In some cases this auspicious result may be the outcome of treatment by pills, but in most it will only be attained by the zealous and intelligent employment of inunctions, supplemented by other methods and by the use of the iodide. In the sections upon Methods of Treatment and upon Special Local and Regional Treatment further information may be found.

There are four classical methods of administering antisyphilitic remedies: first, by the mouth, or stomach ingestion; second, by inunc-



tion; third, by fumigation; and fourth, by hypodermic injections. In addition to these specific methods, there are many adjuvant and accessory modes of treatment, which have for their object the general improvement of the economy and the production of a condition in which the antisymphilitic remedies will be better borne and attended with a greater and more salutary potentiality. In the latter categories we may mention baths of various kinds, massage, the hygienic influences of change of scene and climate, and various tonic and stimulant courses of treatment.

*Treatment of Syphilis by Means of the Mouth, or Stomach-ingestion.*—This method is one very largely, and by some exclusively, used, and it has a quite broad scope, but also many drawbacks and limitations. Antisyphilitic remedies administered by the mouth (and these are composed mainly of mercury and iodide of potassium, used singly or in combination) consist of pills, granules, tablets, capsules, powders, and of liquid preparations of various kinds.

As we have shown in preceding pages that these two agents possess decided therapeutic effects, we must now consider their drawbacks and the accidental and toxic effects to which they may give rise.

Mercury administered by the mouth may cause gastro-intestinal disturbances and dyspeptic symptoms of various degrees, pytalism, stomatitis, and salivation, and a general depression and impairment of nutrition. It is well to remember that inunctions and fumigations may also give rise to similar depressing and annoying conditions, and that the hypodermic use of mercurial preparations is also attended with these drawbacks in greater or less degree, according to the particular agent used and the extent to which it is employed.

The most common form of disturbance due to the ingestion of mercury is a mild form of enteritis, which is attended with colicky pains, borborygmus, and diarrhoea. In many cases this condition is very ephemeral and passes away of itself in a few days, during which the system is becoming accustomed to the action of the drug. The pain and disturbance are felt shortly after taking the dose, and last for an hour or more, and then pass off, to follow in like manner the next dose. In other cases the effect is more severe and lasting, and the patient suffers and becomes weak. To remedy and prevent this untoward action of mercury, the utmost care must be exercised in the matter of diet, which should be bland and easily digestible, and in the avoidance of large quantities of fluids and of alcoholic and malt liquors. In very many books the advice is given that the mercurial should be combined with a small but efficient dose of opium, in order to prevent gastro-intestinal intolerance. As a rule, this advice is very reprehensible and liable to be followed by bad consequences. The mercurial treatment must of necessity be long continued, and it is highly improper to combine it with opium, since addiction to that drug is very liable to be produced. Moreover, no system is in a normal state in which opium is given for a considerable length of time. It is well, therefore, if the necessity is urgent, to let the patient have a little paregoric or other mild opium preparation—just enough to ease the pain—which he may take, under great restrictions, as the occasion may require. Commonly only a few doses will be necessary, particularly if

extract of hyoseyamus is combined with the mercurial. In many cases chalk mixture or a small quantity of tincture of ginger will be sufficient to help a patient over a rough spot. It must always be remembered that in the greater number of cases the urgent intestinal symptoms are of short duration, and that very soon the digestive tract will tolerate mercury without discomfort to the patient.

In some cases in which pills are taken, but chiefly in those in which inunctions, fumigations, and hypodermic injections are vigorously given, colitis of different degrees is produced. This condition is attended with much pain and discomfort, and with a diarrhœa which may be so severe as to be bloody. Under these circumstances the specific treatment must be temporarily suspended and the bowel affection treated symptomatically.

Many patients who have taken mercury, even in comparatively small quantities, for a long or even short period, begin to complain of symptoms referable to the stomach. They say that they have flatulence and sour stomach, and that their digestion is slow and attended with eructations and discomfort. In its early days this condition may not be accompanied by bodily weakness, but its continuance is complicated by general debility, pallor of countenance, indisposition to exertion, and even a depression of the nervous system of such marked intensity that we may call it neurasthenia. This condition is also produced by combinations of mercury and iodide of potassium.

The mouth-lesions produced by the use of mercury are certainly less common than those just spoken of. As a rule, most patients bear mercury well; others are at first moderately affected by it; while in a very few cases its use in a short time produces toxic effects of greater or less severity. There is no point deserving of greater emphasis in the treatment of syphilis than that it is most essential to conciliate the mouth. Therefore the physician must examine this cavity in every instance before putting the patient upon treatment. If there are any bad teeth, they must be removed if possible, and if there are any teeth which, being misplaced, rub or press against the tongue, the cheeks, or the lips, they must be taken out or the uneven portion must be filed off. No portion of them should be allowed to produce injurious pressure or friction upon the parts which surround them. Then the condition of the gums must be observed, and any tumefaction, ulceration, or abnormal condition must be cured. The presence of irritating microbes and of epithelial debris, which, with the tartar, forms a morbid layer around the teeth and upon the gums, is capable of doing much harm. It is imperative that this condition shall be removed. Hyperæmia or inflammation of the mouth, soft palate, and pharynx often presents very serious obstacles to the continuance of mercurial treatment; therefore these structures must receive careful attention, and local medication should be used for the removal of all abnormalities affecting them. Sigmund,<sup>1</sup> who in his day laid so much stress upon the necessity of a healthy mouth in the treatment of syphilis, also emphasized the fact that abnormal conditions of the nasal mucous membranes often acted as serious drawbacks to antisypilitic treat-

<sup>1</sup> "Zur örtlichen Behandlung syphilitische Mund Nasen und Rachenaffectionen," *Wien. med. Wochenschrift*, Nos. 32 and 34, June and July, 1870.

ment. My own experience has taught me that it is absolutely essential that the nasopharynx in syphilitics should be carefully watched and kept in a normal state, in order, first, that no drawbacks to a mercurial-and-iodide-of-potassium treatment may exist there, and, second, that syphilitic processes, so prone to develop there, may be prevented. To sum up, therefore, I will say that in all cases the condition of the nose, pharynx, and mouth of syphilitics must be sedulously watched, and if necessary treated during the whole period of general treatment. By following this advice, many a time will the physician be able to prosecute his treatment, whereas otherwise he would have had to stop for a time or give it up.

As a rule, salivation does not come on very abruptly; as Fournier says, "it does not burst out like a thunder-clap; it announces itself." But it must always be remembered that after the ingestion chiefly of calomel and blue pill, in the course of the inunction-treatment applied with too lavish a hand, in case of the too frequent repetition of very strong mercurial fumigations, and during an active course of hypodermic injections, particularly when the insoluble salts of mercury are employed, very sudden and severe, even alarming, salivation may occur. In these cases severe gastro-intestinal complications may be present. With the avoidance of an intemperate and careless system of medication, and with the watchful attention of the patient by his physician, these formidable accidents will rarely occur.

The most common symptom of mouth-lesion produced by mercury is a sensation of soreness of the gums, felt chiefly upon cleaning the teeth, and also in mastication, or from contact with vinegar or other acid fluids. Many patients will first experience uneasiness and pain around one or both wisdom teeth. In either of these instances of gingivitis we find the gums red, swollen, and more or less exulcerated, and perhaps at their teeth-margin covered with a film of necrotic tissue or membrane which consists of microbes and degenerated epithelial cells. In some cases this condition is confined to the interdental prominences of the mucous membrane; in others the entire gums are swollen, softened, and tender. Under these circumstances the teeth often feel very uncomfortable, and even painful; they become more or less loose, and the patient feels that they are longer than usual. In very bad cases they drop out. As concomitants of this state there is a metallic taste in the mouth and the breath is more or less fetid. Other patients will first complain of a metallic taste in the mouth, and it will be noticed then that the breath is disagreeable. Or before the supervention of these symptoms they may notice that the quantity of saliva is increased, and it may be watery or more or less viscid. Inspection of the mouth then shows a general condition of œdematous hyperæmia. The gums and the mucous membrane of the cheeks at the root of the tongue and of the pharynx are of a deep-red or a whitish-red color. The submaxillary glands may be more or less swollen and painful, and the parotid may likewise be affected. Unless the process ceases, either spontaneously or as a result of treatment, the swelling of the parts increases, the tongue swells, the mouth can with difficulty be opened, and then not to its full extent; the teeth make deep impressions in the mucous membrane of the cheeks, and ulcerations may occur. In these severe cases the suffering of the patient is very distressing and



painful, and deglutition is more or less impaired. The patient cannot chew or partake of solid food, and has to rely upon milk and nutritious liquids for sustenance. To add to his trouble, he grows weak, nervous, restless, and apprehensive; he sleeps little, and has no comfort anywhere. His pallid, anxious facies, his immobile and perhaps swollen mouth and lips, together with the constant flow of viscid saliva and the foetid breath, present a truly pitiable spectacle. Luckily, we now-a-days very seldom see these formidable cases of salivation.

A general depression and impairment of the nutrition of the body sometimes occurs quite early after the ingestion or absorption of mercury. But those cases in which it may be said that there is an intolerance to mercury are happily very rare. In most of them it will be found that if the mercurial by the mouth be stopped, and its guarded use by inunction or hypodermic injection be substituted, the intolerance will cease, and that the drug will work satisfactorily.

As a result of greatly prolonged mercurialization, general debility and impaired nutrition of the body are very frequently produced. In very many of these cases the syphilitic diathesis is still active, new lesions appear, while old ones refuse to disappear, and coincidently the patient begins to look pallid and sickly, to be weak and apathetic, and to suffer more or less from nervous depression. This condition is a frequent outcome of the continuous mercurial treatment, and is sometimes seen in persons who, fearful of the disease, have an insensate and irresistible desire continually to dose themselves with mercury. It is attended with dilatation of the stomach, gastro-enteritis of a mild and chronic type, perhaps colitis, and a general impairment of the nervous system and of the nutritional powers of the body. Under an enlightened system of anti-syphilitic therapeutics in its broadest sense such conditions as these can be readily avoided.

Such is the value of iodide of potassium in the treatment of syphilis that, although we cannot call it a specific or an antidote in a general sense, it certainly may be termed an essential adjuvant or an important helpmate to mercury in the treatment of that disease. We may even go farther than this, and claim specificity in some cases in which, owing to the nature of the lesion, mercury takes second place and the iodide the first. In other portions of this chapter the therapeutical value of, and indications for the use of, this drug are described. We shall here consider the drawbacks and accidents which sometimes complicate its employment. Iodide of potassium is rapidly absorbed into the circulation, as can readily be shown by the starch test applied to the mouth or by touching the tongue or mucous membrane of the mouth with a solution of nitrate of silver. The starch test promptly shows the blue color of iodide of starch if iodine is present, while the pearly nitrate-of-silver stain is quickly turned into a yellowish hue, owing to the formation of iodide of silver. It is by many thought and claimed that iodide of potassium assists in the elimination of mercury from the economy. Melseus and Guillot claimed that this drug was capable of rendering soluble mercury or any of its compounds retained in the tissues of the body, and of causing their elimination with the urine. On the other hand, Suchoff<sup>1</sup> claims, after

<sup>1</sup> "Effect of Iodide of Potassium in Combination with Mercury in Temporary and After-treatment by Mercury," *Vratch*, 1886, vii. p. 840 et seq.

very minute and careful investigations, conducted under the supervision of Professor Tarnowsky, that the iodine salt really retards the elimination of mercury. Suchoff claims that the elimination of mercury by the urine begins later, and the quantity of mercury eliminated is comparatively smaller, when the patient is taking at the same time iodide of potassium.

Iodide of potassium administered during or after a mercurial course lessens at once the quantity of mercury eliminated daily. The practical conclusion to be drawn from these observations is that the iodide is not useful in mercurial poisoning, but, on the contrary, may be harmful. My own experience in the treatment of mercurial stomatitis has convinced me that no benefit whatever results from the administration of iodide of potassium.

Clinically, however, it is very frequently found that the long-continued use of mercury having failed to give relief or having produced a cachectic condition, the substitution of iodide of potassium is followed by involution of the symptoms and improvement of the health. This fact, however, does not warrant the conclusion that the auspicious result was due to any effect produced by the iodide upon mercury supposed to be stored up in the system.

The advocates of the expectant treatment and the antimercurialists (if any now exist) are impressed with the value and virtues of iodide of potassium in early secondary syphilis, and also later in the course of the disease. That this remedy is useful for some of the lesions of the early secondary stage has been pointed out in other portions of this chapter, but it certainly does not follow that it is appropriate as a systematic remedy to take the place of mercury. Indeed, much harm, in the long run, is done by the indiscriminate use of the iodide, particularly in the exanthematic stage of syphilis. In this stage of syphilis there is a tendency to hyperæmia as well as hyperplasia, and very often the iodide renders worse, and even obscures, syphilitic lesions of the mucous membrane of the mouth, throat, and also lesions of the skin. Again, as we shall shortly see, the iodide itself produces multiform lesions of the skin and mucous membranes which are often very difficult to distinguish from syphilitic lesions. I have many times seen syphilitic infiltrations have their starting-points in inflammatory foci in the skin and mucous membranes which were caused by the iodide. Further than this, the iodide is inert against most of the early lesions of syphilis, and is powerless to cure the general condition. Therefore this remedy should be looked upon, as a rule, as harmful in early syphilis, and should not be employed, but it should be used in the cases and with the limitations which I have specified elsewhere.

Iodide of potassium is rapidly absorbed when taken by the mouth, which is the most common mode of its administration. It is also absorbed, well diluted in water, when injected into the rectum, but its use in this manner very often has to be suspended by reason of local intolerance. The researches of Welander have shown that this salt, administered by the mouth to a syphilitic mother, may be found in the urine of the newly-born offspring. Considering the vast number of people, old and young, who for longer or shorter periods take iodide of potassium, it certainly must be confessed that, as a general rule, the remedy is well borne by the human system. There are, however, many persons with whom the drug

disagrees more or less actively. These persons are said to have the iodide-of-potassium idiosyncrasy; that is, that in one way or another the drug produces unpleasant and even toxic effects in them, which we group under the general term iodism. We also read of iodide-of-potassium intolerance, but the truth is that the cases are very exceptional in which the drug is so badly borne that its use has to be totally suspended. While there are many persons who have a greater or less idiosyncrasy against the iodide, there are few who are wholly intolerant of its use. Several years ago it was claimed by H. C. Wood<sup>1</sup> that in all cases of doubtful diagnosis of cerebral syphilis the so-called therapeutic test should be employed, and if 60 grains of iodide of potassium a day fail to produce iodism, for all practical purposes the person may be considered to be a syphilitic. This far-fetched assumption was very properly questioned and combated by J. William White,<sup>2</sup> who, in a circular letter to many syphilographers and physicians, solicited their opinion on the subject. Twelve replies were sent, in all of which it was claimed that personal idiosyncrasy to the iodides was as great in non-syphilitics as in syphilitics; that there are no satisfactory grounds for the assertion that syphilis in any of its stages prevents the production of iodism; and that it is most unsafe to base any diagnostic conclusions upon the presence or absence of toxic symptoms (iodism) after the administration of full doses of the iodides. As stated in my reply to Dr. White, so I may state here, that I think Dr. Wood's therapeutic test a fallacy.

There are many peculiar facts connected with the iodide idiosyncrasy. In some cases a very small dose (a fractional part of a grain) will produce very severe and even alarming effects, and we may be unable even by means of many and varied expedients to overcome the intolerance. In other cases a very small dose will produce unpleasant and even severe effects, whereas a large one will be well borne, either at first or after several trials. In some cases I think that we, to use an apt expression, weaken too quickly, and give up the drug after a little rebuff, whereas with proper moral courage (the urgent necessity existing) we can increase the dose and, by persisting, establish toleration. I have seen cases in which an intolerance of the iodide of potassium lasted twenty years, and at both ends of that period produced a characteristic bullous eruption. On the other hand, I have seen many cases like that of a man who had gummatous infiltration into the soft palate, and was intolerant of iodide of potassium, but in whom I pushed the iodide until iodism ceased and the new growth was absorbed. Four years later (after a life of great indulgence) he had syphilitic pachymeningitis, took heroic doses of the iodide, showed no intolerance, and got well. In many cases abstinence from liquors, alcoholic and fermented, care as to the simplicity and easy digestibility of food, requisite medication for the stomach, and a general improvement of the condition of the alimentary canal, will be followed by a proper acceptance of the drug, after perhaps some preliminary skirmishing. I have seen several cases in which the iodides were well borne previous to the onset of pathological changes in the kidneys, and after

<sup>1</sup> "Iodide of Potassium in Syphilis: a discussion by J. William White and H. C. Wood," *Therapeutic Gazette*, Dec., 1888.

<sup>2</sup> "Contribution to the Discussion of the Diagnostic Value of the Tolerance of the Iodides in Syphilis," *Therapeutic Gazette*, March 15, 1889.



the establishment of the latter they were more or less toxic in their action—sometimes so much so that their administration was of necessity suspended. There is very much evidence scattered through medical literature which goes to show that pathological conditions in the kidneys are a very frequent cause of the iodide idiosyncrasy. I can call to mind cases in which, while the patients were high liver and deep drinkers (one exclusively of champagne), the iodides had more or less toxic action, but when they discarded these irritants and stimulants the iodides produced no disturbance. In syphilitics, as in non-syphilitic subjects, an intolerance of to-day may be replaced by a condition of assimilation a month, a year, or more later. This fact should be remembered in practice, for there is a tolerably widespread opinion that the iodic idiosyncrasy is a lifelong condition.

In many cases symptoms of iodism appear early in the use of the drug; in others this complication is more or less delayed. Its supervention should not, however, lead to too early an abandonment of the drug. It is claimed by some that the presence of free ammonia (the carbonate or aromatic spirit) in a solution of iodide of potassium will prevent iodism, and by others that an alkaline salt, like the bicarbonate or acetate of potassium in combination, will also have this salutary effect; but it is not well to rely too implicitly upon these statements.

Slight or severe nausea and griping pains in the bowels may follow the ingestion of iodide of potassium. They can hardly be called toxic effects, however, for they are usually readily prevented by the addition of a little tincture of ginger or capsicum to the mixture, or of a small quantity of tannin.

The toxic effects of iodide of potassium and of the other iodides may be mild or severe; they may be simple in character, or, again, they may present a marvellous uniformity. Only a general outline of these symptoms and lesions can be given here.

The most common early symptom of iodism is a metallic taste in the mouth and throat, with sometimes fœtor of the breath. Coryza, mild and severe, is also frequently complained of, and is often regarded by patients as cold in the head. There may be mild conjunctivitis and lachrymation combined with the coryza, which may be accompanied with much sneezing and irritation of the nose and eyes, and very often severe pain in the frontal sinuses. In some cases what is called iodide grip is observed. In these rather rare instances the upper air-passages, the eyes, and lachrymal ducts are very much swollen and red. The face becomes swollen, and a red blush resembling erysipelas may be present. The pharynx becomes red and swollen, and the œdema may extend to the epiglottis and glottis. The patient suffers much from burning sensations and from pain, from dyspnoea, hoarseness, and dysphagia. Together with this formidable condition there are fever, weakness, pain in the head, and extreme restlessness. Fenwick<sup>1</sup> reports a case of this form of iodism in which after four ten-grain doses of the iodide of potassium there was such œdema of the glottis and difficulty of breathing that the patient's life was only saved by tracheotomy.

In other cases salivation occurs, which, however, is not usually as

<sup>1</sup> "Severe Case of Iodism: Tracheotomy," *Lancet*, Nov. 13, 1875.

severe as that due to mercury. In most cases it is of a mild and ephemeral character.

Neuralgic pains in the head or jaws are very frequently complained of, and some patients suffer from more or less severe toothache while taking this drug. In other cases there is swelling of the parotid, submaxillary, and sublingual glands, which gives rise to very uncomfortable symptoms in the neck.

It is not uncommon to see œdematous hyperplasia of the soft palate, of the tissues around the root of the tongue, of the tongue itself, and of the pharynx in cases of acute or chronic iodism. I have under observation at the present time a gentleman suffering from secondary syphilis, who, as a result of the improper and intemperate use of iodide of potassium, has swelling of the pharynx and root of the tongue, with much tumescence and prominence of the circumvallate papillæ, who was told by a prominent surgeon that he had cancer of the tongue and that his only hope was in a free extirpation of that organ. This inflammatory condition of the throat and mouth from the use of iodide of potassium, particularly when given in large doses and for long periods, is not at all uncommon, is little understood, I find, by the profession at large, and is a source of trouble and annoyance both to patient and physician.

The toxic effects of the iodides, chiefly of potassium, upon the skin are very numerous and multiform in character.<sup>1</sup> They may all be classed under the general head of dermatitis, of which we find a papular and papulo-pustular form (urticarial), tubercular, tuberous, nodular, bullous, and ulcerative. Besides the essential inflammatory dermal lesions the iodides may produce purpura, probably from their defibrinizing effects upon the blood. In some cases iodide of potassium produces such rapid and feeble action of the heart that its use must be given up.

Though last to be mentioned, particular attention should be called to the gastro-intestinal effects and intolerance of the iodides, chiefly of the iodide of potassium. In most cases the stomach receives the drug kindly; in others it produces a feeling of discomfort and impairs digestion. This condition may soon pass off, either spontaneously or as the result of proper medication and alimentation. In other instances it is a very serious drawback, necessitating the suspension or even the abandonment of the drug. It is always well (the necessity existing) to use every possible means to overcome this troublesome complication. After the long use of full doses of the drug patients very often complain of distressing dyspeptic symptoms and of weakness, and show evidence of emaciation. Their heart-action may be weak and their nervous system profoundly affected. Indeed, a condition of cachexia, or even of neurasthenia, may thus be induced. In such cases we must stop the use of the drug at once, put the patients upon a careful regimen, see that their hygiene is made satisfactory, build them up with tonics, and bring to their aid all fortifying influences.

It is said that long-continued use of the iodides may produce structural lesions of the kidneys.

Persons are frequently met with who have taken iodide of potassium for many years, and who are still obliged to continue it if they would

<sup>1</sup> See my *Clinical Atlas of Venereal and Skin Diseases*, Philada., 1889, for further particulars.

keep their symptoms in check. They generally become familiar with its use, and take it in large quantities, without the physician's advice, as regularly as they take their meals. Other patients cannot, or believe they cannot, tolerate it even in the smallest doses. These are difficult cases to deal with in emergencies. Sometimes the evil is imaginary, and the idea may be dispelled by a little adroitness upon the part of the physician.

*Iodide of Rubidium*.—This drug has recently been recommended as a substitute for the potassium salt, and it is claimed that it is easily borne by the stomach, that it rarely produces iodism, that it does not affect weak hearts, and that it is just as effective as the old remedy. Leistikow<sup>1</sup> reports eight cases of syphilis in which this drug worked well when taken in three daily doses of a tablespoonful of a 5 per cent. solution.

*Iodol*.—As an internal remedy *Iodol* was first used by Pick<sup>2</sup> in a few cases of tertiary syphilis. This observer claims that he observed sufficiently favorable results from its use to warrant its continuance as a therapeutic agent. He observed that very little toxic effect was produced by the drug, and that it had a moderately energetic therapeutic effect. Cervatesco<sup>3</sup> also claims benefit in gummatous affections of the pharynx, hard palate, larynx, and liver in doses of two or three grains three times a day.

Szadek<sup>4</sup> has used iodol in seventeen cases of tertiary and five of secondary syphilis. This author used the drug in doses of from 8 to 16 grains three times a day, continuously for two or three months. He thinks that its value consists in its harmlessness, tastelessness, and absence of odor, and in the large proportion of iodine which it contains. He found no disturbance of the gastro-intestinal canal from its use, and claims that the therapeutic results were most satisfactory, except in two cases of chronic syphilitic hemiplegia. Szadek thinks that its action is like that of other preparations of iodine, but that it is less energetic than iodide of potassium. He believes that iodol can be used instead of iodide of potassium when a mild and prolonged action is desired, but that when a rapid and energetic action is necessary it is well to employ the latter drug.

I have given iodol a careful trial in public practice in a goodly number of cases of tertiary syphilis, in which the iodide usually acts promptly and satisfactorily, and have become convinced that it has very little, if indeed any, noteworthy therapeutic effect. In this experience I find that I am in accord with Schwimmer.<sup>5</sup> Though I have not observed toxic catarrhal symptoms, I have seen disturbances of the stomach and diarrhoea produced by doses of 5 and 10 grains.

For some cases of late secondary and early tertiary lesions of the skin, particularly when attended with scaling, Donovan's solution—liquor arsenii et hydrargyri iodidi—is sometimes beneficial. The dose is 5 to

<sup>1</sup> *Monatshefte für Prak. Dermat.*, vol. xvii., Nov. 15, 1893.

<sup>2</sup> "Ueber die Therapeutische Verwendung des Iodols," *Vierteljahr. für Derm. und Syphilis*, 1886, pp. 583 et seq.

<sup>3</sup> "Ueber die Therapeutische Verwendung des Iodols bei inneren Krankheiten," *Berl. klin. Wochenschrift*, 1889, pp. 26 et seq.

<sup>4</sup> "Die Therapeutische Verwendbarkeit des Iodols in der Syphilidolgischen Praxis," *Wiener med. Presse*, Nos. 8, 9, and 10, 1890.

<sup>5</sup> *Die Grundlinien der Heutigen Syphilis-therapie*, Hamburg, 1888.



10 drops, given in a bitter tincture and well diluted with water, an hour after eating.

Decoctions and infusions of such vegetables as sarsaparilla, yellow dock, saponaria, stillingia, and others have long been held in high esteem by the laity for the treatment of syphilis. They have absolutely no anti-syphilitic influence, and if they are beneficial at all, the effect is due to their influence as tonics, stomachics, diuretics, or diaphoretics. They may be beneficial as adjuvants to mercury and iodide of potassium.

In Germany largely, and in America not very frequently, Zittman's decoction is used in old, obstinate cases of syphilis when the usual remedies are badly if at all borne, and when the physician is at his wits' end to know what to do. In many very unpromising cases I have seen beneficial, and even striking, results; hence this remedy should be kept in mind. The formulæ for the strong and the weak decoctions are as follows:

*Zittmann's Decoction—Strong.*

R. Sarsaparilla, cut,  $\mathfrak{z}\text{xiiss}$ ;  
 Water,  $\mathfrak{z}\text{325}$ , troy.  
 Digest for twenty-four hours, and add—  
 Alum,  
 Sugar,  $\text{āā. } \mathfrak{z}\text{vj}$ ,  
 enclosed in a linen rag. Heat by a steam-bath, in a covered vessel, for three hours, adding toward the close,  
 Anis,  
 Fennel,  $\text{āā. } \mathfrak{z}\text{iv}$ ;  
 Senna,  $\mathfrak{z}\text{ij}$ ;  
 Licorice-root,  $\mathfrak{z}\text{iss}$ .  
 Express, strain, and after several hours decant. It should weigh 312 troy ounces.  
 Put aside as a strong decoction.

*Zittmann's Decoction—Weak.*

Add to the dregs of the strong decoction.  
 Sarsaparilla, bruised,  $\mathfrak{z}\text{L}$ ;  
 Water,  $\mathfrak{z}\text{325}$ , troy.  
 Heat by a steam-bath, in a covered vessel, for three hours, adding toward the close,  
 Lemon-peel,  
 Cinnamon,  
 Cardamom,  
 Licorice-root,  $\text{āā. } \mathfrak{z}\text{ij}$ .  
 Express, strain, and decant; it should weigh 312 troy ounces.  
 Label "Weak Decoction."

When decoction Zitmani (with one *t*) is prescribed, it is prepared in a similar manner, except that to the sugar and alum are added—

R. Calomel,  
 Cinnabar,

$\mathfrak{z}\text{j}$ ;  
 gr. xv.—M.

Enclosed in a linen bag.

Of the strong decoction it is necessary to drink a pint in the morning, and of the weak a quart in the evening. The effect of this treatment is enhanced by placing the patient in bed and inducing well-marked diaphoresis. These large doses produce also a cathartic action, sometimes very violent, and it may be necessary to reduce them. I have seen much improvement in the patient's general condition produced by this method. It frequently improves the appetite, and by its cathartic and tonic effect renders the system tolerant of active antisymphilitic remedies which previously had acted badly.

Under the name "succus alterans" a remedy has attained much vogue within a few years in the treatment of syphilis, chiefly among the laity. It is made of roots and herbs. This preparation was first exploited by the late Dr. J. Marion Sims, who claimed that it had produced wonderful results in the treatment of syphilis in Southern negroes. The

following is a modification of the prescription of Dr. McDade, in whose practice Dr. Sims first saw it used:

R̄. Ext. smilacis sarsaparillæ fl.,  
 Ext. stillingia sylvat. fl.,  
 Ext. kappæ minoris fl.,  
 Ext. phytolaccæ decand., āā. f̄ij;  
 Tinc. xanthoxylon carolin., f̄ij.—M.

Take a teaspoonful in water three times a day before meals, and gradually increase to tablespoonful doses.

I have seen many patients who have taken this remedy at the advice of physicians and of their own accord, and have never seen it produce the slightest antisymphilitic effect. In some cases it seemed to exert a mild tonic action, and in others produced a pleasing purgative effect. It is a remedy in high esteem among some syphilitic cranks, who, though cured, will persist in swallowing drugs. I have known it to be prescribed as a placebo in the intermissions of a mercurial course. Doing no harm, it can do little good, and the human race will not be the loser when this compound shall have had its day.

Cathelineau and Rebourgeon<sup>1</sup> have called attention to a preparation much used by the natives of Brazil, which is called mururé or vegetable mercury. It is a drastic cathartic, and is used by the natives for rheumatism and syphilis. The juice is a reddish liquid of vinous odor and sweetish taste. Injected into a rabbit, death soon followed, and at the autopsy the stomach, intestines, heart, and kidneys were found to be very hyperæmic. No clinical facts are given.

I have seen and tried these so-called vegetable specifics for syphilis from South America, and beyond a purgative effect have found them inert.

As an adjuvant in the treatment of syphilis the fluid extract of coca is a very valuable agent. It is in no sense a specific, and its beneficial action consists in its marked tonic effect upon the heart, capillaries, and nervous system, and upon nutrition in general. In anæmia and cachexia and in the adynamic condition occasionally induced by mercury and iodide of potassium it sometimes works wonders. In some cases I have seen it induce a condition of health by which mercury, which at first was badly borne, became tolerated and curative. In malignant precocious syphilis it acts well by improving the general nutrition. It is very often beneficial to patients addicted to alcoholics, and it may then take the place of those stimulants. My favorite prescriptions are as follows:

R̄. Fl. ext. erythoxylon cocæ, f̄ij;  
 Tinc. cinchon. comp.,  
 Tinc. gentian. comp., āā. f̄ij.—M.

Dose, two teaspoonfuls in a wineglassful of water three times a day, an hour after meals.

<sup>1</sup> "Sur l'Écorce de Mururé, ou le Mercure végétal," *Annales de Derm. et Syphil.*, April, 1893, pp. 458 et seq.

R. Fl. ext. erythroylon cocæ,	3ij ;
Tinc. gentian. comp.,	
Tinc. cinchon. comp.,	āā. 3j ;
Elix. calisayæ,	3iv.—M.

Dose, one tablespoonful in a wineglassful of water three times a day, one hour after meals.

The *thé Mariani* is a very reliable preparation of coca, being practically a fluid extract. In some cases this preparation produces sour stomach, which may be obviated by temporarily reducing the dose. In others, again, a sensation of fulness in the head, burning of the eyes, and buzzing in the ears—in fact, a sensation of mild intoxication—may be produced. Under these circumstances the dose should be reduced.

The use of bichromate of potassium in syphilis is only to be mentioned and condemned.

**The Inunction Method.**—The inunction-treatment, which consists in rubbing into the skin metallic mercury or some mercurial preparation, mixed or suspended in a fatty vehicle, is the oldest method known,<sup>1</sup> and is the one concerning which the testimony of all physicians is that it is the most active, sure, and rapid in its effects of any mode of administering mercury. The objections to it are that it is dirty, unpleasant, and disagreeable; that it soils the skin and the patient's linen and the bed-clothes; that it necessitates time and trouble in its use, and subjects the patient to the risk of exposure. For these reasons it is repugnant to many patients, particularly to women. Some claim that the method is unscientific and not exact, which may be true, but it is efficacious. Many authors lay particular stress upon the occurrence of stomatitis from the employment of this method, and give their readers the impression that this danger is inevitable. Such statements are either based upon the want of a thorough knowledge of this method of treatment and of its technique, or upon results which have followed its careless and intemperate use.

Inunction treatment of syphilis by mercury has, particularly within the past ten years, come into more general use and favor, and the present indications are that it will be more and more widely adopted than heretofore, not only as an adjuvant, but also as the regular system of cure. A very noteworthy fact to be gleaned from the words and writings of the most advanced syphilographers is, that they are gradually losing faith in mercury by mouth-ingestion as the regulation method of treatment, and are using mercurial inunctions much more frequently and for much longer periods than they did in former years. The fear which was once so general as to the use of mercurial frictions has very largely passed

<sup>1</sup> Mercurial inunction was used at the very earliest period of the authentic history of syphilis. In Douglas's *Bibliographica Anatomica*, Lyons, 1734, it is said that Berengarius was the discoverer of its merits, as shown by the following: "Jacobus Berengarius Carpentis ita dictus a Carpi civitate in Italia . . . inunctiones ex hydrargyro in curâ luis venereæ primus fuit inventor illoque solo quætu mirè opulentus redditus est." Also in Joseph Grünpeck's *Tractatus de Pestilentiali Scorra sive mala de Franzos*, 1496, mercurial ointment for the cure of syphilis is mentioned, as well as a gargle to be used in case of salivation.



away, and confidence in this method is gradually extending. This is largely due to the fact that our knowledge of syphilis is more precise and extended than in former days, and that we are better able to determine the conditions produced by the disease, and also the morbid states actually caused by the improper use of mercury. The indications to-day are, that this mode of treatment will ultimately supplant in a general way the other modes, though mouth-ingestion will of necessity be used in very many cases under certain conditions as a method of expediency, and fumigation will still be employed, and injections given according to the varying condition and peculiar necessities of the cases.

It is a mistaken idea that most patients will not undergo the inunction cure. There are those who, by reasons of indifference and of the drawbacks incident to the method, and for prudential considerations, may be unwilling or unable to submit to it. But, on the other hand, I have found, and others have found and will find, that if the advantages of the treatment are clearly and conspicuously presented to the patient, he—or even she—will usually adopt it. It is also a mistake to think that intelligent, well-to-do patients will, as a rule, refuse this method of treatment. They of course would prefer the simple and expeditious method of mouth-ingestion, but when they are told of the great and paramount advantages of the inunction method, of the immunity from present discomfort and suffering which it offers, and the future cure which it renders so probable, they very generally consent to undergo it. Indeed, in my experience it is much easier to obtain the consent of patients in the upper walks of life to submit to and follow up the inunction-cure than it is to deal with patients in a lower sphere of life. Intelligent people, having syphilis, as a rule realize the jeopardy that they are in, and are willing to submit to much discomfort and annoyance, provided they have a reasonable hope that they are to be the gainers thereby. On the other hand, it is almost a hopeless task for physicians to treat patients who are not intelligent and whose sanitary surroundings are not good. In dispensary practice it is often hard work to make patients use their inunctions, and in hospitals the mercurial friction should be administered by the orderly or nurses, for as a rule the patient will make away with his packet of mercurial ointment, and little if any of it will reach his skin.

Though many authors have written in favor of the inunction-treatment, it must be conceded that the writings of Sigmund<sup>1</sup> have done most to popularize the method, to rid it of its dangers, and to place its employment upon a safe and scientific basis. In earlier days the method was followed in a crude and even reckless manner, and as much harm as good resulted from its use. A quotation from Brandis<sup>2</sup> will be of interest in this connection. He says: “Formerly, indeed, the dread of inunction was well grounded: let us consider how patients were treated who were obliged to undergo this course. For weeks at a time they remained shut up in hot chambers filled with mercurial vapor. The ingress of fresh air was carefully avoided, and merely starvation diet was allowed. Nevertheless, surprising cures often took place, which caused so much the more astonishment as the most desperately obstinate and severe cases were selected. But what results were not produced! Salivation, mercurial

<sup>1</sup> *Die Einreibungscure mit grauer Quecksilbersalbe bei Syphilisformen*, Vienna, 1878.

<sup>2</sup> *Principles of the Treatment of Syphilis*, Dublin, 1882.

fever, wasting of the tissues, even death itself, not infrequently followed." Sigmund's dictum was as follows: "In the treatment of syphilis we not only do not require the manifestation of mercurial poisoning, but we cure venereal disorders more surely in proportion as we guard the body from such manifestations."

In adopting the inunction method many considerations should be borne in mind. In the first place, it is absolutely essential that the hygienic surroundings of the patient should be in a satisfactory condition. He should have plenty of fresh air and good, generous food, and should be comfortably situated at his home. He should be as free as possible from mental and physical strain, and should have ample time for exercise, rest, recreation, and sleep. While undergoing this course of treatment he should use every effort to keep his health and nutrition at as high a standard as possible, and to keep himself from hurry, bustle, anxiety, care, worry, and mental over-strain. He should eat such food as will nourish best, and avoid all that taxes his digestive powers. He should be careful to avoid all beverages which tend to derange the stomach or cause diarrhœa. Exposure to cold and dampness must be carefully guarded against, and, though an abundance of fresh air is necessary, ample protective clothing must be worn. In winter flannel should be worn next to the skin, and the bed-room should be well ventilated and kept at a temperature of about 65° Fahr. Moderate exercise is to be commended, but violent, excessive, or exacting physical exertion (the so-called athletic sports) is to be condemned. As a general rule, if the condition of the case is not urgent and will admit of it, it is well during periods of severe cold and great dampness to omit the inunctions if the patient is obliged to be out of doors, and also during periods of intense heat in the city. There is a prevailing opinion among the profession and the laity that persons undergoing an inunction-cure are to an unusual degree liable to take cold. It is well always to see that these patients are not unduly exposed and that they are properly protected, but as I look back I can recall many patients of the out-door dispensary class who, despite warning, exposed themselves to cold while using the inunctions. On this subject Raphael,<sup>1</sup> who had a large out-door-poor service for many years at Bellevue Hospital, says: "As regards the danger to patients of taking cold during its employment, all I can say is that I have repeatedly seen patients come to my out-patient clinic with a considerable amount of the mercury rubbed in upon their person, without the least harm resulting therefrom (though they were cautioned against such a course), evidently having gone about in that condition for days without washing off the ointment, many of these patients being insufficiently clothed at that." My experience in the same syphilitic service many years ago was precisely like that of Dr. Raphael. Brandis very pertinently says on this subject: "Excessive dread of catching cold, even at the present day so widely disseminated, causes frequently great harm. Of course every intelligent patient will protect himself from cold; but we frequently meet with people who make themselves ill by carrying their precautions too far."

*Spreading of Mercurial Ointment on the Skin.*—Welander<sup>2</sup> has lately

<sup>1</sup> "On Some Practical Points in the Treatment of Syphilis with Inunction of Mercury," *N. Y. Med. Journal*, March 6, 1886.

<sup>2</sup> "Ueber der Behandlung der Syphilis mittelst Ueberstreichens, etc.," *Arch. für Derm. und Syph.*, Ergänzungsheft, No. 1, 1893, pp. 115 et seq.

proposed this method of smearing the skin with mercurial ointment and allowing it to stay on indefinitely. In a series of experiments, in which the urine was carefully analyzed, he convinced himself that the therapeutic agent is received into the system even more promptly and in a greater quantity than when inunctions are practised. The advantages claimed for this method are that the patient can treat himself and thus does not need a rubber. It is a simple and easy method and it requires little time for its application. In this way of using blue ointment there is said to be less liability to dermal irritation.

In accordance with the view entertained by many that mercurial inunctions act only by virtue of the vapors of mercury which they emit, Vigier, Mergé, and Carles<sup>1</sup> propose the use of flannels saturated with mercury in a condition of minute subdivision. They are placed on the patient's chest or upon the pillow at night. It is claimed that these flannels give off mercury so freely that it can be detected in the patient's urine. The authors think that from eight to nine milligrammes are absorbed in eight hours. Further observation of this method is necessary.

The most reliable and efficient preparation of mercury for the inunction-cure is the officinal mercurial or blue ointment—*unguentum hydrargyri*—of a strength of 50 per cent., as a rule. In some cases the mild ointment (25 or 30 per cent.) may be used. It is most important that this preparation shall be well made and perfectly fresh. It is not sufficient simply to order the blue ointment, but the patient should be impressed with the necessity of obtaining a perfectly pure preparation, and should be particularly instructed to purchase it of only reliable apothecaries who frequently renew their stock. Many instances of irritation of the skin are due solely to the rancidity of the ointment rubbed in. The matter of the dose should be carefully looked after, so that absolute precision is obtained. Some authors—and among them Cheminade<sup>2</sup>—think that lanolin is to be preferred to lard in the manufacture of mercurial ointment—an opinion with which I must emphatically differ. I had some mercurial ointment thus prepared, and it was pronounced by patients who were by no means faultfinding to be very unsatisfactory, in being less readily rubbed in and being sticky, gummy, and much less effective and absorbable than the officinal ointment.

On the other hand, a blue ointment which is very readily absorbed by the skin has been made for me by Fraser & Co. Its formula is as follows:

R $\bar{y}$ . Mercury,	8 ounces;
Lanolin,	$2\frac{6}{10}$ ounces;
Lard,	$5\frac{4}{10}$ ounces;
Tincture benzoin comp.,	160 min.;
Alcohol,	80 min.

Triturate the mercury with the tincture and alcohol until coarsely subdivided; then add portions of the lanolin and lard, and continue the trituration until the mercury is thoroughly subdivided.

<sup>1</sup> *Journal of Cutaneous and Genito-urinary Diseases*, vol. x. 1892, p. 364.

<sup>2</sup> "De l'Emploi de la Lanoline comme véhicule de l'Onguent napolitain dans le Traitement de la Syphilis," *Gazette Hebdom. des Sciences méd. de Bordeaux*, 1887, vol. viii. pp. 433 et seq.



This ointment is also put up in soft gelatin capsules, called "ovules," which contain either thirty or sixty grains. These ovules can be used very expeditiously, and are very useful to a patient while travelling.

The oleates of mercury have not realized the hopes that were formerly entertained as to their ultimately taking the place of blue ointment in the treatment of syphilis. In the form of 20 and 30 per cent. preparations the oleate of mercury is very irritating to the skin, even more so than blue ointment. My colleague, Dr. Bumstead, used with preference equal parts of 20 per cent. oleate of mercury and simple cerate, which is an unirritating preparation. Of late years I have used a combination of the oleate of similar strength and proportion with vaseline. Schwimmer<sup>1</sup> uses 15 grains of oleate of mercury (20 per cent.), mixed with 30 grains of vaseline—a quantity which he orders for one rubbing. The oleate of mercury, however combined, is rather more apt to irritate the skin than blue ointment, and must be used with much caution and with not too much friction. It is at best a less reliable and efficient preparation than blue ointment, and should be reserved for over-fastidious patients. As a remedy for general medication in syphilis it has little to commend it, and as an agent for local or regional treatment it is far inferior to white precipitate ointment or ointments made of several other mercurial preparations, notably the protoiodide, the deutoiodide, the tannate, salicylate, and the bichloride.

In general, the quantity of mercurial ointment advised by writers is too large. It is essential for the successful treatment of syphilis to avoid the two extremes of very large and very small doses. No arbitrary rules can be laid down, but general principles may be stated, and by them a physician must judge how much of this remedy he shall prescribe. It is important to remember that in general city practice (the patients being usually of the active, busy order) a rather smaller quantity should be used than we should employ upon one who has the opportunity of recreation away from home and its cares. Fournier<sup>2</sup> says that Doyon has been able to use five drachms of mercurial ointment at the Uriage Thermal Springs in combination with the waters, and at other thermal springs larger quantities of the ointment can be used than at home. I have been able, the necessity existing, to use at our seaside resorts, the patients taking daily hot salt-water baths, quantities of mercurial ointment which at home would be harmful. So that we must remember that there is an average, fairly large dose for a patient who is at a watering-place or a rural abode of recreation, and another and smaller dose for those who have to stay at home, and who cannot throw off their social or business cares, but are confined to the daily treadmill of city life.

In general, for adult recreating patients following hygienic rules 60 grains of mercurial ointment may be employed for each friction. This, as a rule, will be well borne by a man of good physique and average build, but it would be too large for a thin, spare man of weakly constitution. At thermal springs as much as 120 grains are

<sup>1</sup> *Op. cit.*, 1888, p. 51.

<sup>2</sup> "De l'Emploi des Frictions mercurielles dans le Traitement de la Syphilis," *Union médicale*, June 11, 1891.

sometimes used in their "lightning cures," but such quantities are scarcely called for, and should only be used with the greatest care and circumspection.

For general practice the average dose of blue ointment may be stated at from 40 to 45 grains, a larger dose being used upon robust and well-developed patients, and a smaller one upon those of thin and flabby structure. The early rubbings are largely tentative, with a view of gauging the patient and the dose. The inunction-treatment should never be begun in a careless manner. The case being a suitable one, two or three frictions of 60 grains each may be tried and the effect watched. Some patients bear these inunctions when of generous quantity with remarkable tolerance for very long periods; others, again, show evidence contraindicating their use after from three to six rubbings. Therefore, the physician should have his patient well in hand, and watch him very carefully every day or two until he has been under the treatment for at least two or three weeks. As the frictions are given and benefit is evident, the dose may be increased to 60 or 80 grains of the ointment; and in general, for regular routine treatment, this quantity will be found ample, but in emergencies and exigencies a larger quantity will be required. While the patient is under this treatment (the general and special condition being favorable) the physician must watch and question him, to learn that he feels stronger and even gains weight, which is very common when this treatment is beneficial, and is really one of the first signs of improvement, or that he loses flesh; that his strength is satisfactory; that his appetite is good and digestion perfect; that he has no elevations or oscillations of temperature; that he sleeps well at night and awakes refreshed; and that he is in no manner troubled with any nervous symptoms, even slight. If, in short, a man shows signs of doing well, has no mouth, stomach, or intestinal troubles, and it is evident that his lesions and symptoms are being bettered, the physician may know that he is on the right track, and should go ahead, but should always be on the lookout for the mouth and the gastro-intestinal tract. When mercury is thus introduced through the skin, it is thought that it enters not by the lungs, but by way of the sweat, hair, and sebaceous follicles, into the lymph-spaces, and then it becomes albuminized and ready for absorption. We then have the stomach free for food, tonics, or the iodide of potassium if it is indicated. Thus we may improve digestion and nutrition by agents such as iron, quinine, strychnine, coca, hypophosphites, etc. This coincident tonic course is often very beneficial in improving the condition of the syphilitically affected tissues, and in rendering them more amenable to the specific action of the mercury. In this connection it is to be prominently remembered that a decided tonic action is produced by generous, nutritious diet, which does so much to engraft upon the tissues the power of resistance to the syphilitic poison. This fact has recently been well brought out by Dymnicki,<sup>1</sup> who strongly advises quinine in weak and debilitated syphilitic persons whose temperature and weight are subject to great oscillations. By its use the bodily

<sup>1</sup> "Action of Quinine in some Grave Cases of Syphilis treated by Inunction, affecting Temperature, Pulse, and Weight of Body," *Gaz. Lekarska*, 1889, 2, 8, ix. pp. 388 et seq.

weight is increased and general improvement follows. Dymnicki found—and my experience is in accord with his—that in many cases the use of quinine enables us to increase the quantity of mercurial ointment. Schwimmer<sup>1</sup> advises in weakly and anæmic persons a preliminary course of the syrup of iodide of iron before beginning the inunction-treatment. In my own practice I have often derived benefit from a similar course.

The next consideration is the preparation of the skin for the inunction-treatment. The circumstances and conditions are rather different when the treatment is received at home from that administered at thermal baths and at health resorts. When the patient undergoes the frictions at home he must first have a local or general bath. As a rule in city life, the inunctions are of necessity taken in the evening, whereas in health resorts it is well that they should be taken in the morning. The home patient may take a bath at a temperature of 96° to 98° F., after which he should be well rubbed with a towel. When possible, in warm weather one or two Turkish baths a week may be taken in alternation with the regular baths. But of these baths the physician must be very watchful, and if they in any way tend to debilitate the patient, who under the circumstances sleeps poorly and awakes unrefreshed, stiff, and weak, they should be discontinued. Under these circumstances, and when it is impossible to have bathing facilities, the part to be anointed should be carefully washed with warm water and soap, and then sponged with a 2 or 3 per cent. solution of carbolic acid. This latter application should also always be used after the general bath. By strict attention to the aseptic condition of the skin we can almost always avoid dermal inflammatory complications. When it is urgently necessary to treat parts covered with hair, they may be clipped, or even shaved, and then thoroughly washed with the carbolic solution. Upon parts sparsely supplied with hairs great care should be taken that an aseptic condition be produced. By means of this care many unpleasant drawbacks may be avoided.

It is always best that the inunctions should be made by a professional rubber or a trained nurse, if possible. If, owing to circumstances, the patient must be his own rubber, he should be made clearly to understand the technique. In the first place, the physician must see that the dose is made precise, and if the ointment is put up in packets of oiled paper allowance must be made for the loss occasioned by the adherence of some of the ointment. Then no glove or pads or protective coverings to the hands should be used. It is a mistaken idea that persons administering the inunctions are liable to salivation, for they are not, provided they take ordinary precautions. I have employed many trained rubbers and nurses in this treatment, and I have never seen any untoward condition of the hands result. Brandis,<sup>1</sup> Wilson,<sup>2</sup> and others, who have had much experience at Aix-la-Chapelle and at our own Hot Springs of Arkansas, also speak of the immunity to local and general mercurialization enjoyed by professional rubbers. The simple procedure of anointing the hands with oil or with a stiff simple cerate, or even with soap, will effectually prevent the absorption of the mercurial ointment.

The ointment should be divided into several portions, and each one should be firmly rubbed into the skin, employing the two palms when the

<sup>1</sup> *Loc. cit.*, p. 79.

<sup>2</sup> "On the Treatment of Syphilis," *Lancet*, March 27 and April 5, 1886.



anatomical arrangement of the parts will admit of it. Combined with the friction, a moderate amount of massage may be practised. In this way all the ointment must be rubbed in, so that no lumps are left, and the surface of the skin will then look as if it had been lightly pot-leaded. As a general rule, from twenty to thirty minutes are necessary for an inunction. After this operation suitable night-clothes should be put on to protect the bed-linen, and the patient should retire. When the preliminary general bath cannot be taken, it is well to let the patient drink directly after the rubbing a pint or more of pure hot milk, and then cover himself up well with blankets in order to induce perspiration. According to his case and to the whim of the patient, hot lemonade or hot tea (and in some cases a little brandy, whiskey, or gin may be added) may be taken to produce diaphoresis after the inunction. For this purpose hypodermic injections of pilocarpine have been used, but, according to my observation, they are not beneficial in any way. Lewin and Zeissl also found pilocarpine inefficient, and even harmful, in the treatment of syphilis.

At thermal springs the patient has his hot bath early in the morning, then his inunction, followed by a period of repose and sweating. After that he is ready for his walk, and during the day may partake of the mineral waters of the place. In my judgment (as I state elsewhere), no specific effect is produced by the waters, either taken internally or used for baths, at the Hot Springs of Arkansas, at Aix-la-Chapelle, or at any other thermal resort. The beneficial effect is largely derived from a variety of conditions, such as climate, rest, recreation, and abstinence. It is very certain that at all springs and health resorts the inunction-treatment, vigorously pushed, is well supported. This applies to patients who pursue the method at our seaside resorts and use hot salt-water baths, and also those at thermal and mineral springs. The same tolerance of mercury may be obtained in the mountains and in rural districts if patients are subjected to rigid rules of hygiene and regimen. It is a matter of congratulation that at our own Richfield Springs all the benefits so much vaunted at Aix-la-Chapelle and Uriage may be obtained. When patients are stopping at sulphur or mineral springs they instinctively desire to drink the waters, but they should do so only under medical advice and supervision. It is claimed that sulphur waters exert a depurative action and carry off the mercury and effete products through the kidneys and intestines. This contention is not clearly settled; therefore I usually tell patients to try the sulphur waters in moderation, and if they agree with them and they are seemingly benefited, they may continue their use. But very often these waters produce dyspepsia and gastro-intestinal, and even cystic, irritation, and it is necessary to abandon them. The other mineral waters at our resorts should be employed only under proper advice.

Among many of the laity, and among some physicians, there is an impression that the use of sulphur baths and waters internally may have a revealing influence in rendering evident a latent or dormant syphilitic condition, and some physicians at the thermal springs put patients through what they term a test or proof cure or treatment. In my judgment, this opinion is incorrect, and I agree with Spillman,<sup>1</sup> Brandis, and others that the instances in which, after sulphur-water treatment, a latent syphilis is

<sup>1</sup> "Influence des Eaux sulfureuses dans le Traitement de la Syphilis," *Comptes Rendus de la Société de Médecine de Nancy*, 1882.

called into activity are either mere coincidences or the result is due to the same influences which ordinary vapor or hot-water baths may produce. It has been claimed by Guntz<sup>1</sup> and others that the waters and salts of sulphur springs may be used with benefit in combination with the inunction-treatment followed at patients' homes. I have given this method a careful trial, and I have seen it followed in the practice of other physicians, and my opinion is that no perceptible good is gained, though much trouble and expense is entailed. In every large city the facilities for obtaining sulphur baths are ample, and it is advisable in those cases in which the inunctions seem to be backward in their effects to allow the patient to take a few of them as an experiment. In general, one or two sulphur baths a week during an inunction-treatment may be a benefit. They certainly have a decidedly happy moral effect on some patients. In cases of ulcerative lesions particularly, and also in those of the papular and tubercular forms, sulphur baths and simple hot-water and vapor baths are often of much aid by reason of their stimulation of the skin.

Within the past ten years I have seen the wisdom of, and the necessity for, a more extended and comprehensive application of mercurial ointment in the treatment of syphilis; and my observations, worked out upon a clinical basis, have been confirmed by certain pathological studies made by Neumann.<sup>2</sup> This observer has shown that several months (four to eight) after the disappearance of visible syphilitic lesions there may remain in the skin in and around its glands and follicles, and around its vessels, morbid products consisting of exudation cells. This infiltration of small round-cells is not as copious and extensive as it is in very early syphilis, but its occurrence certainly shows how the disease may remain latent in the system. On this subject I may quote with benefit from my own paper:<sup>3</sup> "There is one fact that the surgeon should always keep in mind in the treatment of syphilis—namely, that all syphilitic lesions, even the most minute, are to be feared as possible sources of continuous or intermittent reinfection of the system. The morbid cells contained in these lesions are capable of great, even infinite, multiplication, and the so-called syphilitic relapses are due to the continual recurrence of these cell-proliferations, which occur from morbid foci left over at an earlier date. While all deposits of syphilitic new-growths in any part or tissue are of much danger in their ultimate results, those which occur in the lymphatic ganglia, in the lymphatic vessels, and around blood-vessels are especially so by reason of the activity of growth of these organs, and of their very ready transposition to all parts of the body by means of the lymph and blood circulation."

Pathological facts like these prove to us very forcibly that besides the general mercurial action through the blood, we should, whenever it is possible, bring mercury into direct contact with the syphilitic processes by what is termed the local or regional method. For this purpose the inunction-treatment is especially adapted, since by the absorption of mercury through the skin morbid processes there latent are cured without in any way impairing the general constitutional results.

<sup>1</sup> *Die Einreibungsur bei Syphilis in Verbindung mit Schwefel-wassern*, Dresden, 1873.

<sup>2</sup> "Welches Sind die Anatomischen Veränderungen der leütischen Haut nach Ablauf der Klinischen Erscheinungen," *Wein. med. Wochenschrift*, 1885, xxxv. p. 825.

<sup>3</sup> "Some Practical Points in the Treatment of Syphilis," *Med. News*, Dec. 7, 1889.

It is very possible that even with a supposed well-regulated inunction course after the older plans, some lesions may escape, and thus the perpetuation of the disease be allowed. This fact is forcibly shown by a case reported by Köbner<sup>1</sup> in a valuable paper on the local and regional treatment of syphilis, of a man who was covered with an unusually extensive and abundant papular syphilide, who had upon the back a molluscum pendulum as large as a nut, upon which there were two papules. After six weeks of treatment, due to enormous induration of the lymphatic ganglia, in which no less than sixty drachms of mercurial ointment were used, all the papules underwent involution except the two upon the molluscous tumor, which had escaped the inunction process. This striking case is only a conspicuous example of what we constantly see when inunctions are not universally made over the whole body. Thus even with toxic symptoms of mercurialization present, syphilitic lesions about the anus and head and elsewhere, which have not been brought into direct contact with the mercurial ointment, will very frequently be seen to persist. Yet in these cases the patient (and I have very often found his physician to agree with him) thinks that he has been undergoing a most thorough cure, and they both marvel that in spite of such seemingly energetic measures that the disease should persist.

Therefore, I say that we should carry out the inunction treatment in a far more systematic, thorough, and minute manner than has been generally done. To this end I divide the body into eleven subdivisions, each of which is to be submitted to its own mercurial friction. They are as follows:

1. The neck and head.
- 2 and 3. The arms, palms, and axillæ.
- 4 and 5. The legs and soles.
- 6 and 7. The thighs, with groins and Scarpa's triangle.
- 8 and 9. The breast and abdomen.
- 10 and 11. The back from the root of the neck to lower part of the gluteal region.

In non-hairy persons there is little trouble in anointing the neck. In those whose necks are densely covered with hair we may be forced to confine the inunctions to the parts not covered. In urgent cases and where the lesions are copious it is necessary to have the hair clipped or shaved. If there are scalp lesions or any in the beard an ointment composed of white precipitate 30 grains and vaseline 1 ounce may be used freely. In this case it may be well to make the regular dose of mercurial ointment used elsewhere on the neck smaller. Prior to rubbing the ointment into the scalp and beard shampoos and antiseptic lotions should be used.

It is important that the whole surface of the arms should be acted upon in a vigorous manner. If there are any lesions of the palms, these parts should receive careful attention, and in any case it is well to anoint them several times during the treatment. It is most important to bring the ointment into contact with the contents of the axillæ; and this can be done with impunity, provided care is taken that the parts are rendered aseptic.

<sup>1</sup> "Ueber therapeutische Verwerthung der localen antisypilitischen Wirkung des Quecksilbers," *Tageblatt der Versamml. Deutsch. Naturf. und Aerzte*; and *Deut. med. Wochenschrift*, 1884, pp. 757 et seq.



The legs and the soles should be well rubbed with both hands, and any lesions upon the latter parts should receive especial attention. In like manner the thighs should be treated, and the groins and the surface over Scarpa's triangle should be firmly rubbed for a sufficient time. If the ganglia in the groins are unusually swollen, it may be necessary to apply a layer of mercurial ointment on lint or one of the mercurial plasters. Care need not be taken to keep the ointment from the scrotum.

Sometimes the inunctions produce irritation upon the breast and abdomen, and the method is pursued with difficulty. Under these circumstances all means toward the avoidance of dermatitis and follicular inflammation should be adopted.

Patients rarely have any difficulty in administering to themselves inunctions upon the buttocks, but it is impossible for them to reach their backs. Therefore it is necessary to get outside aid, which in most cases I have found possible. By this method the whole body is treated in eleven sances. In many cases, when we use from 40 to 60 grains of the ointment for each rubbing, we can give the whole series of eleven on successive days. But, as I have said before, we can never be positive that we can do so; therefore the patient must be watched and questioned each day as to his condition. In this way we feel our way along, and continue or suspend the inunctions as the indications of the case teach us.

In giving a regular treatment by inunctions it is well to omit them for a few days, according to the indications, and then to go over the same ground again. In a systematic treatment we may give fifty to eighty, or even a hundred, inunctions with proper intermissions, and then it is well to desist for a short or long time. In ordinary cases, where the inunction method is used as a regular mode of treatment, it may or may not be necessary to administer the iodide of potassium at the same time. In most cases it will not be necessary to employ a large dose of this salt. But in old and untreated cases it will be necessary to use stronger doses of the ointment, perhaps employ them more uninterruptedly, and combine them with large doses of the iodide, given internally. This question of the conjoint use of inunctions and iodide of potassium will be considered farther on in the section upon Special Medication.

It sometimes happens that we desire to keep up a mild mercurial action, and the circumstances of the patient will not admit of the employment of frictions. In these cases the ointment may be spread upon a cotton-flannel belt, which may be worn around the body. In cases of enlargement of the spleen, tenderness over the liver, with or without jaundice, pain in chest (pleuritic or resembling angina pectoris), and in swollen and painful joints, these mercurial bandages may be employed with much benefit. This method is also useful in the treatment of syphilitic infants and children.

Though the inunction treatment is uniformly potent and beneficial, it has its drawbacks and complications. These are—1, dermatitis and follicular inflammation; 2, stomatitis and salivation; 3, digestive disturbances and intestinal complications; 4, sleeplessness; 5, inanition and exhaustion; 6, tendency to congestion of the head, heart, and lungs; 7, tendency to fever and perspiration; 8, pain in bones and joints. Though this list looks rather formidable, in actual practice

the cases are few in which it is necessary to abandon the treatment or in which modifications and expedients fail to smooth matters over.

With careful antiseptic attention to the condition of the skin, and with the employment of fresh and pure ointment, we rarely encounter such an amount of inflammation in it that the patient is made to suffer or that the treatment is curtailed. Zinc ointment, Lassar's paste, and dusting powders, with protective layers of cotton, are very beneficial in the prevention of dermal inflammation.

Under the older system of inunction, when a larger quantity of blue ointment was employed it was not uncommon to find mouth and throat lesions. When, however, the treatment is carried out on the lines heretofore indicated, the occurrence of salivation will be rather rare. Mouth lesions from inunction are similar to those produced by the internal use of mercury, with the exception that their onset is more sudden and abrupt and their severity greater. It is therefore necessary to follow the directions already given to prevent salivation in the matter of attention to the teeth, mouth, and throat. It is also well to make the patient rinse the mouth well with solutions of chlorate of potassium and alum, and also with a mild solution of sugar of lead and acetate of alumina in peppermint-water. This precaution is particularly necessary when for any reason we are compelled to push the treatment.

Very often a lowering of the dose or its temporary suspension will cause the disappearance of irritability of the stomach. The trouble should also be treated symptomatically. In like manner, intestinal irritation should be treated, and very often much benefit will result from a full dose of castor oil.

In some cases sleeplessness is but an ephemeral symptom. It may persist and necessitate a suspension or diminution of the treatment. The bromides, sulphonal, phenacetin, and perhaps morphine and chloral, may be temporarily resorted to, but always under the physician's knowledge and full direction. It is better to abandon the method than use any of these drugs for a long time.

In women particularly, a feeling of exhaustion and inanition, perhaps with digestive disturbance, may complicate the inunction treatment. The usual expedients of lowering the dose, of allowing intervals of repose, of administering tonics, should be resorted to. If, after a conscientious trial of the method, these symptoms continue, it must be given up.

Tendencies to congestion of the head, heart, and lungs should be treated symptomatically, and the frictions carefully pushed and watched.

A feverish condition, with or without perspiration, or the occurrence of the last symptom alone, should call for quinine and iron tonics, generous food, and perhaps a mild malt liquor, or even claret or burgundy in moderation.

Pains in the bones and joints, fixed or fugitive, may give more or less trouble. They usually pass away by care on the part of the physician and patient. I have met with several cases, however, in women in which these symptoms were so severe that a discontinuance of the frictions was made necessary.

A mild and continuous mercurial effect may be produced by the application of plasters of mercurial ointment. This may be spread on chamois-skin, and adjusted to the body by means of a belt made of flannel or of

canton flannel. In cases of lesions of the spleen or liver or of intrathoracic pains in early syphilis this method of mild mercurialization is very beneficial. It may also be employed in cases in which, for any reason, inunctions are contraindicated. In many cases of hereditary syphilis mercurial ointment may be kept continuously upon one or more regions of the body with decided benefit.

Akin to this method of using mercury is the application of mercurial plasters. The old-time emplastrum de Vigo, in which Chassaignac placed so much confidence, may be used, either in large plaques or on small surfaces for local treatment. There are in the market at present several mercurial plasters which are worthy of use.

This slow and prolonged treatment is much extolled by Unna,<sup>1</sup> particularly for commercial travellers and those very desirous of secrecy. He uses a mercurial plaster-mull, and with his usual ingenuity has devised a frame of zinc glue which serves to keep the plaster in place and to prevent it from melting at the edges, with its inevitable discoloration of the skin and the underwear. In severe cases of paralysis, cranial exostoses, etc. Unna girdles the entire trunk with his mercurial plaster-mull.

A modification of the foregoing treatment has been proposed by Quinquaud,<sup>2</sup> who uses a calomel plaster made as follows:

Ry. Emplast. diachyli,	3000 parts;
Hydrarg. chlorid. mite,	1000 " ;
Ol. ricini,	300 " .—M.

The plaster is to be melted, and to it added the calomel suspended in the castor oil.

This quantity is to be spread upon linen, so that fourteen strips, each nine feet by seven and three-quarter inches are produced. Of this plaster a square of two and a half inches contains 18 grains of calomel. Analysis of the urine of patients treated with this plaster showed the presence of mercury in from six to ten days. The plaster is to be applied over the region of the spleen, the skin having previously been carefully washed. It may be applied elsewhere upon the body, with a view to its general mercurial effect and also for the cure of local lesions. Quinquaud says that the use of this plaster is free from danger and inconvenience, and that by its use mercury is slowly and surely introduced into the system. My own experience with it is not large, but I regard it as a useful addition to our therapeutic measures.

Within the past decade a new method of treatment, which is really a modification of the inunction plan, has been introduced by Schuster of Aix-la-Chapelle,<sup>3</sup> and used by others. This method is by friction of the skin with a mercurial soap made in Paris and called *savon Napolitain*. A good lather is made with water and allowed to dry on the skin, upon which it leaves a thin film of mercury. This may be applied over a more

<sup>1</sup> "Ueber die Therapeutische Verwendung von Salben und Pflastermullpräparaten," *Berlin. klin. Wochenschrift*, No. 38, 1881, and "Die Medicamentösen Leime," *Aerztlichen Vereinsblatt*, 1886, No. 176.

<sup>2</sup> "Traitement de la Syphilis par le Sparadrap au Calomel," *Bulletin de la Société Française de Dermat. et de Syphil.*, 1890, pp. 63 et seq.

<sup>3</sup> "Die Mercurseife, Savon napolitain," *Vierteljahr. für Derm. und Syphilis*, Heft 1, 1882.



or less extensive surface, but its too frequent application may cause dermatitis. The lather is less objectionable in odor and in feeling than the mercurial ointment; hence Schuster thinks this method is more elegant than inunctions. Improvement in cases of syphilis thus treated was noted, and chemical examination revealed the presence of mercury in the urine. Oberländer<sup>1</sup> endorses the method, but prefers a soap originated by himself, which is composed of 1 part of mercury combined with 3 parts of green soap, perfumed with oil of lavender. Oberländer claims that the lather made from this soap is of lighter color than that of the French preparation, and that it is actually absorbed into the skin, even without much friction.

Spillmann<sup>2</sup> advocates a soap made of pure olive oil and caustic potash, with which is incorporated 50 per cent. of mercury. This soap, which may be perfumed according to taste, is neutral in reaction and causes no irritation. A portion of the body is lathered with the soap, and after drying it is covered with thin paper or some suitable garment. After twenty-four hours the part is washed off and dusted with rice powder.

Watrazewski<sup>3</sup> claims that calomel soap is equally as efficacious and more cleanly and easier of use than mercurial ointments. He advises a pure potash and olive-oil soap as the basis. His stronger soap consists of 1 part of calomel to 2 parts of the soap, and the milder is composed of 1 part of calomel to 3 of the soap basis. Of these soaps he uses two to three grammes daily, employing sufficient water to make a lather and rubbing it well into the skin by a rotatory movement for from ten to fifteen minutes. In this way the calomel is thoroughly rubbed in, and the skin is left in its normal color. Watrazewski claims that this method is expeditious, unattended with discoloration, not disagreeable to the sense of smell, not followed by dermal irritation, and is equally as efficacious as the inunction treatment. Examination of the urine of patients thus treated showed the constant presence of mercury, and slight gingivitis attested the fact of its absorption.

It may also be well to mention Dietrich's<sup>4</sup> mercurial soap, which is well thought of by Bronson. In my judgment the use of these soaps should be restricted to local or regional therapeutics.

### Fumigation.

The mercurial vapor-bath is a method of treating syphilis which was revived and perfected by Langston Parker<sup>5</sup> and Henry Lee.<sup>6</sup> It is useful in very many cases and in many conditions of syphilis—not as a routine treatment, but as one of reserve and exigency. Many preparations of mercury have been used in this form of treatment, but calomel and cinnabar are the agents upon which experience has shown that most

<sup>1</sup> "Die Mercurseife ein Neues und Praktisches Ersatzmittel für die Mercursalbe," *Vierteljahr. für Derm. und Syphilis*, Heft 4, 1882.

<sup>2</sup> "Le Savon mercuriel comme succédané de l'Onguent napolitain," *Annales de Derm. et de Syphilographie*, 1885, pp. 496 and 497.

<sup>3</sup> "Le Savon au Calomel dans la Traitement de la Syphilis," *Bull. de la Société Franç. de Derm. et de Syph.*, May, 1893, pp. 136 et seq.

<sup>4</sup> "Sapo Unguissus und Seine Anwendung als Salben Körper," *Monatshefte für Prak. Dermatologie*, 1887, pp. 1068 et seq.

<sup>5</sup> *The Modern Treatment of Syphilitic Diseases*, London, 1871, pp. 352 et seq.

<sup>6</sup> *Lectures on Syphilis*, Philadelphia, 1875, pp. 93 et seq.

reliance may be placed. To obtain good and satisfactory results these drugs must of necessity be perfectly pure and free from admixture.

When calomel alone is used, from 20 to 40 grains may be placed upon the lamp, but in some urgent cases even 60 grains may be required. As a general rule, however, the smaller quantities are most serviceable, and they may be used over a longer period of time. The large doses of calomel administered by moist vapor are generally used in cases of severity and of exigency, and are not frequently repeated. Cinnabar may be used in somewhat larger quantity than calomel, but in general my practice is to combine the two salts in one bath. As an average dose I have found that 20 grains of calomel and 40 of cinnabar fused simultaneously in connection with moist heat produce prompt and safe results. This dose may be increased or diminished according to the condition of the case. In large cities there are usually one or more establishments in which these baths are given under the advice of physicians. In that case the physician need only prescribe the dose and the number of baths which he desires the patient to take, and the bath attendants will carry out his wishes. Unfortunately, in some establishments the attendants, having a smattering of medical knowledge, think they know more than the doctor, and proceed to treat the case themselves. As Dr. Bumstead puts it, their "inherent tendency would seem to be to absorb the patient at the same time that he absorbs the mercurial fumes."

In some cases, when the baths are unobtainable or when the patients object to go to the bath establishment, this method may be pursued at home. For this purpose it is necessary to use either Lee's or Maury's lamps, by means of which the mercurial salt is volatilized and steam generated at the same time. The patient is stripped and enveloped in one or more blankets or in coverings made for the purpose of mackintosh or India-rubber lined with flannel, and then the flame is started. In a few minutes perspiration is induced, and the evaporated calomel is deposited upon the body. Usually the protective garments fit closely at the neck, but in some there is a slight opening, through which some of the fumes may escape and may be absorbed in respiration. When deemed necessary by the physician the patient may breathe in some of the fumes, but it is always well to allow an admixture of air with them. Twenty to thirty minutes are sufficient for a bath, after which the patient is allowed to cool off slowly. When practicable the patient should retire at once to bed, preferably enveloped in the garment used in the bath. It is well, if the patient has to dress and go out, that as little friction of the skin as possible should be used, in order not to rub off the minute particles of mercury. In cold weather due care should be taken that the patient is properly protected when he goes out after the bath.

These baths should never be taken directly after meals. It is better that they should, if possible, be taken just before going to bed or in the evening, but in any case fully two hours should elapse after a meal. As a rule, patients should be in good condition as to their stomachs and bowels when they are subjected to this treatment, and they must be rigidly prohibited from using alcoholics. While undergoing mercurial vapor treatment the patient must be carefully watched in order that no drawbacks may be encountered. Thus if he complains of feeling tired and debilitated after a bath, it will be necessary to reduce the quantity of

mercury and also the amount of water to be evaporated. In many cases harm is done by using too much steam vapor. Some patients complain of headache, and it is then necessary to administer a purge or to moderate the amount of food ingested.

It is well to begin by giving one bath every other day, and then to increase to a bath daily if the necessity of the case demands it. Some patients bear these daily baths well, while others experience unpleasant symptoms from them. As a rule, after one or two baths improvement is observed, but in some cases a beneficial effect is delayed for a week or two. The number of baths to be taken can only be determined by the condition of the case. In general it may be said that a course of baths extending over one or two months will be sufficient for that time. This period, however, may be lengthened. In many cases only a few baths are necessary, they being employed for some temporary condition or as an adjuvant to other methods of treatment.

While a patient is thus being treated the physician should carefully watch the state of his gums and of the gastro-intestinal tract, and remedy any disturbance. It is not uncommon to observe a mild form of mouth lesions in patients taking a course of mercurial baths. This condition may be cured by local means and by the temporary suspension of the baths or by diminishing the strength of the mercurial employed. Sometimes, when large doses have been frequently used, a sudden and violent colitis is developed. This condition, painful and sometimes alarming, is readily cured by rest, cessation of treatment, and the use of opiates.

Mercurial baths are useful in the whole secondary stage of syphilis, and also in the tertiary period. They may be employed to remove some obstinate local lesion or to expedite the disappearance of a general rash. Late secondary rashes, rebellious to other methods, are frequently dispelled by this one with promptitude. Neuralgias, rheumatoid pains, cephalalgias, pains in joints and fasciæ are often promptly relieved by mercurial baths. In cases in which for any reasons other methods of treatment are contraindicated we can frequently resort to mercurial fumigations with marked benefit.

Wells<sup>1</sup> has proposed a very simple method of local fumigation for cases of syphilitic lesions of the palms. A hole large enough to admit the hand is cut in an ordinary hat-box, and  $\frac{1}{2}$  to 1 drachm of calomel is put underneath on a tripod, and a spirit-lamp produces the fumes which form a deposit on the hand.

*Thyroid Extract and Blood-serum Therapy.*—Thyroid extract has been recently recommended by J. Duncan Menzies<sup>2</sup> for the treatment of severe cases of syphilis. He reports four cases of men in a very weak, sickly state, who also suffered from malaria and bowel complaints. These men presented grave rupial and ulcerative lesions, which were uninfluenced by mercurial treatment. They were given five to fifteen grains daily of the thyroid extract, specific treatment having been suspended, and, according to his report, the favorable results were little less than marvellous.

<sup>1</sup> *Medical Record*, May 13, 1891.

<sup>2</sup> "A Report on Some Recent Cases of 'Malignant' Indian Syphilis Treated with Thyroid Extract," *British Med. Journ.*, June 7, 1894.



Basing their theory on its bactericidal action, a number of observers have used subcutaneous injections of the serum of animals and of the blood of syphilitics, with the hope of discovering a true specific treatment for syphilis. It will be noted that there is a want of uniformity of success in the results obtained. Tommasoli<sup>1</sup> used lamb's blood-serum, and claims that he cured his patients. Sartori<sup>2</sup> used ox blood-serum on four cases with beneficial effect. Bonaduce employed the serum from hereditary syphilitic children, and states that he observed good results in his cases. Pellizzari<sup>3</sup> also used the unfiltered serum of syphilitic subjects, and obtained the best results when the injections were given early in the disease. He thinks that serum taken from persons in whom the infection is active is best, for the reason that it contains more antitoxine. Other observers have written more or less enthusiastically upon this new method of treatment. It is interesting to know that Kollmann<sup>4</sup> followed up Tommasoli's work, and failed utterly in curing syphilis with the blood-serum of sheep, calves, dogs, and rabbits. We know absolutely nothing on this subject as yet.

*Hypodermic Injections.*—Within the past decade the use of mercury hypodermically in syphilis has been largely extended, and to-day this method is held in high repute by many physicians. As I shall show in the sections upon Corrosive Sublimate and Calomel, this method of employment of these drugs is, within certain limitations as a measure of utility, reserve, and exigency, of marked benefit in many cases. It, however, should never be adopted as a routine treatment.

The chief claims of the advocates of the method by hypodermic injections of calomel and other mercurial salts, in preference to the older and more classic modes of treatment, are as follows:

1. It is simple, more exact, more convenient, and more expeditious.
2. It is applicable to all stages of the disease and to patients of all ages.
3. The practitioner remains the master of the treatment throughout.
4. It spares the patient's skin and stomach.
5. It ensures accuracy and precision of dose, and is attended with more rapid action and greater potentiality of the drug.
6. It is superior to, and less objectionable than, inunctions, and more permanent in its effects.
7. It is less liable to be followed by relapses, and gives the patient a greater immunity against the ulterior effects of syphilis than any other known method.
8. It effects a *cure* by the use of a minimum quantity of mercury, and at little expense.
9. It bothers the patients very little, does not necessitate change in mode of life or regimen, does not cause them to see their physician very often, and has the advantage of giving them a holiday of eight days, or more when calomel is used, during which they have no medicine to take or medical procedure to undergo.

These claims, it must be remembered, are made by enthusiasts, and

<sup>1</sup> *Gaz. Med. degli ospitali*, Nos. 28 and 70, 1892.

<sup>2</sup> *Ibid.*, Aug. 2, 1892.

<sup>3</sup> *Giornale Ital. delle mal. ven. e della Pelle*, 1894, pp. 398 and 469.

<sup>4</sup> *Deut. med. Wochenschr.*, No. 36, 1892, p. 806.

the reader must not be misled by their scope and boldness. It has been claimed that mercury thus administered has occult curative properties hitherto unknown, but of this there is really no evidence.

Within recent years much has been written eulogizing the effect of insoluble preparations of mercury, and there is at present a tendency to the disuse of the soluble preparations. It is claimed that the soluble salts of mercury are so rapidly absorbed and eliminated that their effect is less potent and much more ephemeral. On the other hand, it is claimed that insoluble preparations of mercury are slowly absorbed, are retained for long periods in the system, and that their effect is more active and prolonged. It is needless for me to discuss these questions here, for the reader can gain very clear ideas by a perusal of the following pages. In my judgment, the soluble salts of mercury are of much benefit in many cases, and their hypodermic use is not attended with the serious drawbacks and dangers incident to the use of insoluble salts hypodermically. In certain cases and with marked limitations insoluble salts, particularly calomel, thus used may be productive of benefit.

In former years injections were made into the connective tissues; to-day intramuscular injections (particularly of the insoluble salts) and intravenous are largely in vogue. In my opinion, the innovations are neither beneficial nor necessary.

The extent of the literature of hypodermic injections in syphilis contributed within the past ten or twelve years is simply appalling, and in it there is really very little which is of practical value. In a chapter like this, in which completeness is aimed at, it is necessary to give a survey of the progress made in the treatment of syphilis. To that end I have gone over and condensed this huge mass of literature, and I present an epitome of it here for what it is worth. It will be seen that almost every preparation of mercury has been experimented with in the hypodermic-injection treatment, and that the chemist's art has been sorely taxed to produce new preparations. Each new preparation has been exploited as the ideal of perfection, and in most cases a hearty welcome has been accorded it, so that a witty German reviewer has made the following paraphrase of an old maxim applicable to the subject: "*De novis nil nisi bonum.*" After all is said and done, the bare fact remains that corrosive sublimate and calomel are the two agents worthy of confidence, and they are not excelled in any way by any others.

For convenience of description, I will divide the preparations of mercury used hypodermically into the following groups: 1, the insoluble salts; 2, the soluble salts; 3, the so-considered antiseptic group; and 4, the amide group. Iodide of potassium, alone and in combination with mercury, and iodoform has also been employed subcutaneously, and the essential facts of their use will be presented.

**INSOLUBLE SALTS.**—*Calomel.*—Of the insoluble salts of mercury, calomel is the one most extensively used and most uniformly efficient. Subcutaneous injections of the salt were first recommended by Scarenzio<sup>1</sup> in 1864, and in 1868 that author and his disciple, Ricordi,<sup>2</sup> published a

<sup>1</sup> "Primi tentativi di cura della sifilide costituzionale," *Annali di Medicina*, Aug. and Sept., 1864.

<sup>2</sup> *La Méthode hypodermique dans la Cure de la Syphilis*, translated by Dr. Oscar Max. van Mons, Brussels, 1869.

pamphlet of ninety-nine pages in which they claimed brilliant results in the cure of syphilis. Since, at the present time, there is a revival on the part of some physicians in various countries of this method, it is proper that a synopsis of our knowledge should be here presented. Though this treatment, which has become known in medical literature as the method of Scarenzio, was used in Italy and in Germany principally by Sigmund, it had not, until within a decade, been tried, except in isolated instances, in other countries. In the year 1883 a Russian physician named Smirnoff<sup>1</sup> published a pamphlet in which he claimed to have modified and improved Scarenzio's method, and earnestly advocated its general adoption. In the year 1886 this author published a second pamphlet,<sup>2</sup> in which he laid greater stress upon his former claims. These writings of Smirnoff have resulted in a more general knowledge and employment of calomel subcutaneously in syphilis, so that to-day the method of treatment is accepted as a part of their armamentarium by a large number of observers.

Scarenzio claimed—and others have endorsed his view—that calomel introduced under the skin is acted upon by the alkaline chlorides of the blood, and slowly transformed into the bichloride, which in its turn is absorbed into the system. This author thought that 6 grains of calomel, administered in two injections at varying intervals (eight, ten, fourteen, and twenty-one days) into two different portions of the body—and he preferred the outer sides of the arms and thighs—were sufficient for a cure. In the early stages of the trial of this method it is stated that abscesses invariably followed the injections, but this complication was thought little of. Glycerin and mucilage of acacia were the vehicles in which the calomel was suspended.

The views of Sigmund<sup>3</sup> on the treatment of syphilis are generally worthy of close attention, and it is interesting to note that after a prolonged trial of Scarenzio's method he reached the conclusion that we can only assign very narrow limits to the employment of the hypodermic method, and can only recommend it in the milder and more simple forms of secondary syphilis. Sigmund saw very clearly that syphilis could not be cured in the rapid and high-pressure manner claimed by the Italian syphilographer, and in his employment of the latter's method he made radical modifications. Sigmund used smaller doses of calomel: instead of 3 grains injected once in eight days or at a longer interval, he used  $\frac{3}{4}$  of a grain twice a week, and extended the treatment over a longer period. He preferred the sides of the chest and the belly as the sites of the injections.

In the light of existing knowledge of the treatment of syphilis by hypodermic injections of calomel, the following general summary may be given as to dose, technique, indications, and results:

The calomel must be perfectly pure and reduced by steam sublimation. Some authors go so far as to recommend that it be washed in boiling alcohol and dried. It may be suspended in pure glycerin, glycerin and water, mucilage of acacia, or in vaseline oil. Some observers use equal

<sup>1</sup> *Om behandling af Syfilis medelst subkutana Kalomel injectioner, af Georg Smirnoff, Helsingfors, 1883.*

<sup>2</sup> *Developpement de la Methode de Scarenzio, Helsingfors, 1886.*

<sup>3</sup> *Vorlesungen über neuere Behandlungsweisen der Syphilis, 3d ed., Vienna, 1883.*



quantities of sodium chloride and calomel mixed in water. It is better that each dose should be freshly prepared, and in the weighing of the drug and in its trituration with pestle and mortar every precaution should be taken to prevent contamination. As a rule, 1 grain of calomel is sufficient for a dose; and this should be suspended in 10 or 12 drops of the vehicle used. In urgent cases 2 grains may be injected, but rarely is this much required. When the dose is mixed freshly for each injection it is necessary to prepare from four to five times the quantity in order to be certain that a full dose is drawn up in the syringe.

In certain rare cases, particularly of lesions of the eye, ear, and cerebro-spinal system, in which a decided action was needed, I have employed injections of calomel suspended in water which contained chloride of sodium in solution. Krecke<sup>1</sup> has used this treatment on these lines in Strümpell's clinic. His formula is a good one, and is as follows: Calomel and chloride of sodium, of each 5 parts, to distilled water 50 parts. Of this liquid the contents of a Pravaz syringe may be injected every eight or ten days. This combination has been used by many observers, notably Róna, Matthès, Sterne, Neumann, Kopp and Chotzen, Dellen, and Finger.

Smirnoff is certainly correct in insisting upon thorough antisepsis in the administration of these injections; therefore I am careful to enter fully into the necessities of the technique. The hands of the operator should be thoroughly cleansed, and the parts to be injected should be washed with soap and water and scrubbed gently with a brush. After this they should be well saturated with a 5 per cent. carbolic solution, and then dried. The syringe must be kept perfectly clean, after having been rendered aseptic after its last employment. It should have a rather larger needle than usual, one having a calibre about twice as large as that of those generally used, and it should be nearly an inch and a half long. The working of the syringe should be easy and perfect, and its adjustment to the needle should be accomplished without hitch or delay. Previous to introduction it should be ascertained that no air has lodged either in the needle or the syringe. The injections are to be made at a right angle to the surface of the skin, and not in an oblique manner. The needle is to be slowly, but firmly, pushed in until the subcutaneous tissues are reached, and then the piston is to be very slowly pushed down. The idea is to produce as little violence as possible to these delicate tissues. Then the needle is to be carefully withdrawn between two finger-tips, pressing carefully but firmly on the injected spot. There is no necessity for light massage or for the application of plaster or collodion over the site of injection, though there is no objection to the latter.

The site of injection preferred by Smirnoff, Jullien, Watrazewski, Klotz, and others is the depression in the buttocks, an inch behind the posterior border of the great trochanter. Here the connective tissue is very lax and abundant, and pressure is not felt in any of the attitudes of our daily life. It is always better that patients should be selected who have but a moderate quantity of fatty tissue; therefore in very fat and closely-knit subjects fear of abscesses resulting from a want of diffusion of the injected fluid is to be entertained. In this limited area of course

<sup>1</sup> "Ueber die Behandlung der Syphilis mit Subcutanen Calomel injectionen," *München med. Wochenschrift*, 1877, No. 6.

only a few injections can be made, but it is to be remembered that the advocates of this treatment speak of *cures of syphilis* by the use of 6 grains of calomel. Other parts of the body may also be selected, but it should always be remembered that there must be plenty of loose cellular tissue, that bony prominences are to be avoided, and that places liable to be subjected to pressure during the day or in sleep must be spared. In some cases of active and grave intra-ocular, aural, and cerebral lesions the nucha, temples, and scalp have been and may be selected with advantage as sites of injection. Experience has shown that the thighs are prone to undergo abscess-formation from the injection of insoluble, and even soluble, preparations of mercury. Therefore, these regions, as well as the arms and forearms, should, unless under urgent circumstances, be avoided. I have found that injections of calomel and of corrosive sublimate may be made in the hypogastrium when care is taken not to go down to the groins or the mons veneris. The lateral portions of the chest have also been used, particularly by Sigmund.

By some it is advised that the patient should lie down when the injection is made, and it is a good rule in the administration of all forms of mercurial injection to place the patient in such a position that tension is not exerted upon the part to be injected. Though some observers state that they allow patients to go about their business after injection, I am strongly of the opinion that it is well for them to be quiet for at least an hour or two, or to lie down for several hours if possible.

Until within the present decade calomel injections were made into the subcutaneous connective tissues, and this site of deposit is preferred by some authors. Following, however, a suggestion of Soffiantini, a disciple of Scarenzio, a number of experimenters have thrown the mercurial salt deep into the muscular tissue, where it is claimed in an acid medium absorption is more rapid and certain. In my own practice, with the limitations which I observe as to this method of treatment, I have always injected into the connective tissues, preferring to have a superficial to a very deep subfascial abscess if that unpleasant complication should develop. Whichever site of deposit is chosen by the physician, the greatest care must be observed to get the needle well into the soft tissues. It is very unfortunate to throw the injection into the deep corium; therefore the point of the needle should be well below this layer. An injection should never be thrown into the connective tissues over the bony surfaces, nor anywhere near the periosteum.

Symptoms of two varieties are observed after these injections—those which develop at once, and those which appear more or less remotely after the operation. In some cases pain in the track of the needle and in the injected focus is complained of. This symptom may be severe and it may be mild. It is often ephemeral in duration, and again it may last one or more hours. As a rule, women complain of it much more bitterly than men.

In some cases a disk of redness and inflammatory hyperæmia of the skin is seen around the point of puncture. If proper antisepsis has been attained, the inflammatory plaque in most cases gradually pales and disappears. If, however, any particles of dirt have been left in the track of the injection an abscess of that part is very apt to form.

Within a few hours or within a day or two in very many—I may say

in most—cases a moderate swelling can be felt well under the skin at the injected focus. This nodule may be circumscribed and unattended with surrounding inflammation, or it may go on to the formation of a large and brawny swelling limited to the deep tissues, or perhaps complicated with inflammatory exudation into the derma. The onset of these sequelæ indicates the necessity of rest and quiet, and perhaps the use of cooling lotions. In some instances the nodules will gradually undergo resorption, but in very many softening takes place slowly after the subsidence of the immediate inflammatory symptoms. It seems to be the general opinion that when softening has occurred it is better to refrain from opening the mass, for even when marked fluctuation is felt resorption may occur, or at the worst the abscess will point and burst. In the latter event it rarely causes much trouble in healing, and very seldom leaves sinuses through the skin. These abscesses may become encysted or they may undergo cheesy degeneration and subsequent absorption. Whereas before Smirnoff's time abscesses were of inevitable occurrence, with the improved technique of to-day they may be rendered very much less numerous than formerly. Even in Sigmund's experiments the number of abscesses was reduced.

To the eye these nodular masses when excised look like a cellular adipose lump well saturated with a rather thick fluid of chocolate color, and in their centre a necrosed nucleus. According to Kopp and Chotzen, there were no bacteria found in the specimens examined by them. Under the microscope these calomel abscesses are found to contain blood, leucocytes, fatty matter and crystals of fatty acids, and the mercurial salt not yet absorbed. They are really necrotic and not septic abscesses. The fact of the absorption of the mercurial salt thus injected is proved by the prompt disappearance of syphilitic lesions and symptoms, and the demonstrable presence of mercury in the urine, fæces, and saliva. Balzer's observations, based on autopsies, go to prove that three weeks or a month are required for the absorption of the mercury.

Though it is claimed by the most ardent advocates of the calomel injections that salivation is not frequently produced, and even if developed that it is mild, according to my reading and experience this accident is not uncommon, particularly when as large a quantity as 3 grains have been injected every eight or ten days. The truth is, that one should be always on the alert and watchful of the condition of the mouth when these injections are employed. Salivation complicating this method of treatment may appear after the second or third injection, and, though rarely, even after the first. Cases are on record in which during a seemingly auspicious course of injections alarming salivation has set in. To explain this fulminating form of ptyalism the view has been expressed that the drug has a cumulative effect, or that its absorption was slow at first, and that under unknown conditions it suddenly became very active and resulted in an explosion. Such facts carry with them their own teaching.

In the Paris hospitals, in the services of Besnier, Balzer, and Du Castel, enterorrhœa and colitis of varying degrees of severity and persistence have been observed. The imminence of these complications teaches us that we should never proceed in a bold manner in using these injections by throwing under the skin large quantities of calomel at short intervals. Cosati injected 8 grains of the salt, which caused a phlegmon-



ous abscess, produced gangrenous stomatitis, and such a general morbid state that the patient nearly died.

Lesser<sup>1</sup> reports a case of mercurial erythema following a calomel injection. He further says that he has seen abscess less frequently follow the subcutaneous use of calomel than of yellow oxide.

Runeberg<sup>2</sup> reports the case of an anæmic woman, thirty-four years old, recently syphilitic, to whom three injections of  $1\frac{1}{2}$  grains each of calomel were given at intervals of eight and twenty-four days, and who became so debilitated and suffered so much from diarrhœa and ulcerations of the mouth that she died. At the autopsy great destruction of the mucous membrane of the intestines and softening of the spleen were found. Vogeler<sup>3</sup> reports a case in which calomel injected deep into the glutei muscles produced such a severe abscess that an incision was required, together with free curetting of the walls. He further details a case in which salivation and diarrhœa, together with prostration and even collapse, were so severe that life was threatened. The patient was saved by opening the injected spots, scraping them out, and applying Paquelin's cautery. In a third case very alarming symptoms were only controlled by the adoption of this procedure.

The following case, reported by Kraus,<sup>4</sup> is worthy of attention: A healthy man, aged thirty years, was injected twice, with an interval of seven days, with  $1\frac{1}{2}$  grains of calomel. He was soon after attacked with salivation, bloody diarrhœa, and anuria. He died on the sixth day after the last injection, and at the autopsy severe dysentery with perforation of the gut, diffuse bronchitis, parenchymatous nephritis, and ulcerative stomatitis were found. There was no urine in the bladder. Overbeck claimed that anuria is a symptom of mercurial intoxication.

Klotz<sup>5</sup> details a case in which, after a calomel-and-oil injection, his patient felt a sensation of heaviness in the leg near the spot injected, and was attacked with alternating chills and fever. He had severe pain in the left side of the chest, difficulty of breathing, and slight and painful cough. Examination showed a temperature of  $102^{\circ}$  Fahr., in the axilla and symptoms of pneumonia. In a few days the bad symptoms passed off. Klotz is led to think that "embolism of the oil forming part of the injected fluid into the lung had taken place." He speaks of another case in which similar phenomena, but of a milder character, were observed.

It is also well to remember the experience of Staderini<sup>6</sup> in the case of a syphilitic man, suffering from neuro-retinitis. This observer injected into the temporal region of each side of the head one gramme (15 grs.) of a 1 to 10 suspension of calomel, in order to bring the mercury as close

<sup>1</sup> "Ueber Nebenwirkungen bei Injectionen unlöslicher Quecksilber verbindungen," *Vierteljahr. für Derm. und Syphilis*, 1888, pp. 909 et seq.

<sup>2</sup> "Quecksilber-intoxication mit todtlichen ausgang nach subcutanen Calomel-injectionen," *Deut. med. Wochenschrift*, 1889, pp. 4 et seq.

<sup>3</sup> "Zur Behandlung der Syphilis mit subcutanen Calomel-injectionen," *Berliner klin. Wochenschrift*, 1890, No. 27, pp. 940 et seq.

<sup>4</sup> "Ein Beitrag zur Kenntniss der Wirkung des Quecksilbers auf den Darm," *Deutsche med. Wochenschrift*, 1888, No. 12.

<sup>5</sup> "Clinical Observations on Intramuscular Injections of Insoluble Mercurial Salts in Syphilis," *Journal of Cutaneous and Genito-urinary Diseases*, Feb., March, and April, 1890.

<sup>6</sup> "Iniezione di calamelanos alla tempia conseguente embolia della arteria temporale superficiale e gangrene locale." *Bollet. del Sez. d. Cult. del Scienz. med.*, 1887, 6, and *Vierteljahr. für Derm. und Syphilis*, vol. xix. 1156 and 1157.

as possible to the lesion, and thus to obtain the most active local effect. As a result, on one side a gangrenous spot was produced which laid bare the temporal artery and destroyed one of its two twigs. The author very properly calls attention to the small quantity of connective tissue in the temporal region, and to the firm, bound-down condition of the overlying integument. Injections, if used in these parts, must be made with the greatest care, and not in too large a quantity, and vessels must be avoided.

Scattered in the literature of this subject we find many claims of brilliant results and cures. Flarer by means of three injections of  $1\frac{1}{2}$  grains of the salt cured a case of condylomata (gummy tumors) of the iris with posterior synechia. Scarenzio cured a case of cerebral syphilis with two injections, while iodide of potassium was taken internally. Soresina reports eight cases of specific eye diseases, such as complete paralysis of third nerve, keratitis punctata, retino-hyaloiditis, amaurosis, amblyopia, and neuro-retinitis, thus cured; while Stephanini produced brilliant results in a severe case of gummous infiltration into the pharynx. In eight cases Quaglino, by means of one, two, and three injections of 3 grains of calomel into the temporal region and arms, promptly cured paralysis of the third nerve, iritis, and keratitis punctata, retinitis, neuro-retinitis, and progressive atrophy of the optic nerves. Magri gives similar results in six similar cases, the injections being made into the temples and arms. Many other cases are to be found in medical literature in which conspicuously brilliant results have been claimed in the cure of the cerebral and ocular lesions of syphilis by Scarenzio's method. Sigmund's cures by this method were those of the mild early manifestations of the disease, which of course readily yield to mercury administered subcutaneously, as indeed they would if the remedy had been given by the mouth. Smirnoff claims that he cured cases of tertiary syphilis, gummy tumors, tubercular, ecthymatous, and serpiginous syphilides, nocturnal pains, rheumatism, lesions of the bones, and insomnia. Other observers have failed to see benefit in the pains of syphilis, bone lesions, or insomnia. Smirnoff significantly remarks that if, during a course of injections in tertiary syphilis, aggravation of the symptoms occurs, they should be stopped at once, and that the iodide of potassium should be substituted. Klotz<sup>1</sup> claims very satisfactory results from calomel and yellow-oxide-of-mercury injections, administered to private patients for primary, secondary, and tertiary lesions. It must be remembered that while patients are undergoing this method of treatment, as indeed under any form of mercurialization, they should be placed in the best possible hygienic conditions of all kinds. Though it is claimed that relapses are less frequent and less severe after this treatment than after any other, there is really no substantial evidence to prove the assertion.

It is also important to bear in mind that in old age, in cases of anæmia, of cachexia, of weak heart, of chronic visceral diseases in general, in persons having a bad state of the mouth and bad teeth, this treatment is contraindicated. Though the same ardent advocates consider it a method suitable for infants, young children, and pregnant women, I am far from their way of thinking.

From an experience of this method of treatment dating over twenty-five years (having seen the original trials of it by my colleague, Dr. Bum-

<sup>1</sup> *Op. cit.*

stead, in 1866), and from a study of all that has been written upon it, I can but reiterate what I have often said in medical debates—that it is a method of treatment of utility in emergency. It may prove useful in some cases spoken of elsewhere in this essay, such as those of ocular, aural, and cerebral syphilis, when given very cautiously and only in a few doses. That it never will be used as a systematic treatment extending over a period of years, as Neisser and Leloir suggest, I am firmly convinced. It is a treatment which is generally irksome and repulsive to patients, always attended with more or less discomfort and pain, and often producing destructive subcutaneous lesions over the body, which cause mental and physical suffering, and which of necessity must impair the patient's health and strength. In some cases, as we have seen, it has been known to imperil and to destroy life.

In the foregoing section prominent mention has not been made of the combination of calomel with oil of almonds, olive oil, or oil of vaseline. The clinical facts relating to this modification of Scarenzio's method can be more clearly and briefly brought out as an addendum to the section upon gray oil as a remedy in syphilis.

*Metallic Mercury.*—The administration of metallic mercury has not been extensively tried in the treatment of syphilis, and it must be confessed that the advantages claimed by those who have thus employed the agent are not conspicuously brilliant. Fürbringer<sup>1</sup> was, according to my reading, the first to inject metallic mercury under the skin, using the following liquid: mercury, 2 parts; mucilage acacia with glycerin, 10 parts; of which the dose is the contents of a Pravaz syringe. At the time of injection little pain is experienced, but in about twenty-four hours symptoms of inflammation appear, which may end in abscesses. If the skin is rubbed after these injections at intervals, mercury may be found in the urine quite early, but when simply deposited under the skin it may there remain and produce no effect. Fürbringer thinks this method of treatment should only be used when inunctions are contra-indicated and when the mercurial is not well borne by the mouth. To Luton,<sup>2</sup> however, belongs what credit there may be in another innovation in the employment of metallic mercury in syphilitic therapeutics. This observer claims that if mercury in its pure state be injected into the muscular tissues, it will there undergo peptonization and digestion by means of the acid fluids. In a limited experience of these injections he found that syphilitic patients grew fat, and that their disease was favorably influenced.

Prokhoroff<sup>3</sup> states that he has thus treated forty cases, and that he considers this method of treatment superior to inunctions or to injections with any other mercurial. He injects from 6 to 30 grains (0.5 to 2.0 gm.) of the metal at a time once a week, and employs hot baths to accelerate absorption. Symptoms promptly disappeared and no toxic effects were produced. Prokhoroff thinks that the mercury traverses the system in a pure state in the form of very minute particles.

<sup>1</sup> "Zur localen und resorptiven Wirkungsweise einiger mercurialien bei Syphilis insbesondere des subcutan injicirten Metallischen Quecksilbers," *Deut. Archiv für klin. Med.*, 1879, 24, pp. 129-157.

<sup>2</sup> "Des Milieux Hypodermiques," *Archiv. gén. de Médecine*, 1882, vol. ii. pp. 526 et seq.

<sup>3</sup> *Vruch*, No. 40, 1887, p. 766.



Iakovleff<sup>1</sup> used 5 to 20 grains of pure mercury in weekly injections, which were followed by daily kneading and rubbing of the injected spot and by hot baths every two or three days. This author claims a minimum number of relapses in cases in which on an average  $83\frac{3}{4}$  grains of metallic mercury were injected over a period of ninety-three days. The pain is said by him to be trifling, and to disappear quickly under local massage and hot baths, and indurated nodules and abscesses were not produced. Iakovleff mentions the fact that in cases previously treated by frictions mercurialism appeared after these injections.

Von Düring<sup>2</sup> also injected pure mercury into the buttocks of seven patients, using one-half the contents of a Pravaz syringe, more or less. When small doses were injected the effect was delayed, but large doses were promptly followed by such severe mercurial intoxication that excision of the injection-nodule in the glutei muscles was rendered necessary. In a patient injected in the forearm a movable, sharply defined, fluctuating tumor of the size of a pigeon's egg was formed, and over it the skin was of a deep red and traversed by sinuses, through which metallic mercury, but no pus, exuded. The microscopical examination of this mass when removed showed a picture strikingly resembling spindle-celled sarcoma. Von Düring therefore thinks that metallic mercury is unsuitable for subcutaneous injection, for the reason that small doses act too slowly, while large ones are apt to produce too intense and continuous an action. On the other hand, the following case of Augagneur seems to prove that mercury may become encysted, and from time to time be absorbed into the system. Augagneur's<sup>3</sup> case presented a tumor of the thigh which followed two injections of metallic mercury. A peculiarity of the case was that intermittent salivation occurred, and that on one occasion it seemed to follow a blow upon the thigh. The tumor was very large, and an incision into it down to the muscle revealed the fact that a great part of the mercury injected had not been absorbed.

*Oleum Cinereum, or Gray Oil.*—*Oleum cinereum*, or gray oil, is a semifluid, fatty, mercurial liquid introduced into medicine by Professor E. Lang of Vienna in 1886.<sup>4</sup> This author claimed exceptional merit for this therapeutic agent, and in his last essay,<sup>5</sup> after an experience of five years in its use, he states that his earlier convictions have been strongly confirmed. It is urged that this oil is well borne, and that the usual drawbacks to the use of mercury are very slight, and that even when they do occur they are mild and ephemeral in character. Lang considers this combination to be superior to mercurial frictions. Before it is used upon patients, however, he insists that the condition of their mouth and teeth shall be carefully attended to.

Gray oil is prepared as follows: A given quantity of lanolin—1 or 2 drachms—is rubbed up with considerable chloroform to emulsify it. This

<sup>1</sup> *Proceedings of the Riga Russian Med. Society*, 1889, p. 87, and *British Journal of Dermatology*, 1889, vol. i. p. 481.

<sup>2</sup> "Die Einwirkung des Regulinischen Quecksilbers auf tierische Gewebe." *Monatshefte für Prakt. Dermatologie*, Nov., 1888, pp. 1059 et seq.

<sup>3</sup> "Tumeur d'origine thérapeutique de l'injection de mercure métallique," *Lyon médical*, March 30, 1890, p. 455.

<sup>4</sup> "Zur Syphilis-therapie," *Wien. med. Wochenschrift*, Nos. 34 and 35, 1886.

<sup>5</sup> "Behandlung der Syphilis mit Subkutanen Injectionen von grauem oele," *ibid.*, Nos. 48 and 50, 1889.

mixture is to be thoroughly triturated, during which operation the chloroform will evaporate. While, however, the mixture is still in a fluid state, metallic mercury to the amount of double the quantity of the lanolin is to be added, and the trituration further kept up. As a result, a pomade of mercury is left, which represents mercury two parts and lanolin one part. This is called strong lanolin gray ointment. From this salve-basis a 50 per cent. oleum cinereum or gray oil may be obtained by mixing three parts of it with one part of olive oil. A mild gray lanolin ointment may be made in the same manner as the strong by taking equal parts of lanolin and mercury and thoroughly mixing them. From this salve-basis a 30 per cent. gray oil may be made by mixing six parts of it with four parts of fresh almond or olive oil.

Lang uses, therefore, two forms of gray oil, the one containing 50 per cent. and the other 30 per cent. of mercury. These preparations should be kept in small quantity in glass-stoppered bottles and in a cool place. With care they may be kept in perfect condition for many months.

Neisser<sup>1</sup> uses a modification of Lang's gray oil, made as follows: Mercury, twenty parts; ethereal tincture of benzoin, five parts; and liquid vaseline forty parts. This compound should be thoroughly triturated for a long time (care being taken that an aseptic condition is observed) until a homogeneous liquid is produced. This observer thinks that the gray oil has a large sphere of usefulness, and that it may even be used during pregnancy.

Balzer<sup>2</sup> and Reblaub have used Neisser's gray oil in preference to that of Lang, but were not very favorably impressed with its results. They noted pain and tumefaction after the injections into the buttocks, and that a lameness was produced which passed off after rest.

Althaus<sup>3</sup> has lately advocated for the treatment of syphilitic nervous affections a modification of Lang's gray oil, made as follows: Metallic mercury, one part; pure lanolin, four parts; and five parts of a 2 per cent. carbolic oil. This is said to be a homogeneous gray cream which has no tendency to decomposition. The dose is about five minims for an injection.

It is always necessary to warm the gray oil, either over a spirit-lamp or in hot water, and then thoroughly shake it before using it. Lang injects three-quarters of a grain (0.05) to one grain and a half (0.1) of the 50 per cent. solution twice in the first week in two places, and half as much the next week. Such is the claimed enduring efficacy of the remedy that Lang does not administer another injection for two or four weeks. Double the quantity of the 30 per cent. solution may also be employed. In the subsequent injections Lang is explicit in stating that they should not be made stronger, but that they may be given at various intervals, according to the urgency of the case, of one or two weeks indefinitely. It thus happens that no pause, as indicated just now, is

<sup>1</sup> Harttung: "Die Verwendung des oleum cinereum benzoatum (Neisser) zur Syphilis-behandlung," *Vierteljahresschrift für Dermatologie und Syphilis*, 1888, pp. 367 et seq.

<sup>2</sup> "Traitement de la Syphilis par les Injections intramusculaires d'huile grise benzoïnée," *Bulletin médical*, No. 74, 1888.

<sup>3</sup> *The Treatment of Syphilis of the Nervous System*, London, 1891.

observed, but that a continuous treatment is followed. Increased rapidity of action is produced by making injections into two spots, and a more enduring action results than from one injection of a similar quantity. Lang says that his treatment may be used according to the views of the experimenter, either continuously, by intermissions, or even symptomatically. He speaks of its efficacy in local and regional therapy, in cases of circumscribed infiltrations, and of ganglionic enlargement.

In the nervous affections of syphilis and the neurasthenia produced by that disease Lang claims that injections of gray oil are most efficacious, and that a notable improvement in appetite and health is soon experienced.

The sites of injections are the back, a few inches on each side of the spine, beginning about the scapula and ending at the buttocks. In the regional therapy the injection should be made near the lesion to be acted upon. The injections are made into the subcutaneous connective tissues.

Certain observers, notably Hallopeau and Kaposi, have reported cases of very alarming mercurial intoxication (great asthenia and intractable colitis) as being caused by injections of the gray oil. In his latest communication Lang analyzes these cases in full, and claims that they resulted from an excessive and intemperate use of the mercurial compound, and that they should not stand as evidences of its dangerous character.

It is claimed by Lang that local pain is seldom caused by these injections, and that when it exists it is mild in character; also, that little if any inflammatory oedema or infiltration of the tissues is produced. In these assertions he is borne out by Trost,<sup>1</sup> who instituted comparative tests between gray oil and a lanolin-olive-oil-combination of calomel. On the other hand, Lindstroem<sup>2</sup> states that Lang's injections are slow in action, attended with relapses, accompanied and followed by pain, and frequently give rise to diffuse infiltrations. Stomatitis is frequent and severe, and accompanied by profound anæmia and diarrhoea. Lindstroem further says that these injections may give rise to embolism—that in one case he observed a consecutive paralysis of the right side of the face, and in another intense oedema of the right upper limb and pneumonia of the right side. If, now, we compare the drawbacks noted as following injections of calomel and gray oil, we may reach the conclusion that, notwithstanding all that is said in their favor, they sometimes give rise to very unpleasant symptoms, and rather exceptionally to conditions which threaten and even compromise life. Therefore, I think that their use should be restricted to well-selected cases in which other remedies are contraindicated or are impracticable of employment. When used much care and observation is required of the person who administers them. In my reading I have been struck forcibly by the fact that the most serious results have almost invariably followed injections in which fatty matters have been the vehicle of suspension. Then, besides the cases already cited, the case of Lesser<sup>3</sup> may be

<sup>1</sup> "Ueber das Oleum Cinereum im Vergleiche zur den Calomel-präparaten," *Wiener med. Wochenschrift*, 1888, No. 38, pp. 1374 et seq.

<sup>2</sup> "Treatment of Syphilis by Subcutaneous Injections of Oleum Cinereum," *Meditz-inskoïe Obozrenië*, 1890, xxxiii. pp. 7 et seq.

<sup>3</sup> *Op. cit.*, pp. 913-915.



mentioned: A man, thirty-eight, had received five injections of a minute quantity of tannate of mercury in olive oil, and after the last one the patient was seized with a convulsive cough and became cyanotic. He then had diarrhœa and dulness at the base of his lung, with crepitant râles and rough breathing. He luckily escaped with his life. Therefore I think that these methods of treatment should never be largely employed as routine therapeutics.

It may be of interest to add that Watrazewski recently reported that he had made experiments upon animals which convinced him that injection of oily substances without the addition of mercury may give rise to embolism of the lung. In the section on Calomel Injections it is noted that Klotz<sup>1</sup> had such an experience after a calomel-oil injection. It is certain, therefore, that there is danger in hypodermic medication when the mercurial is suspended in any oily substance or liquid.

*Yellow Oxide of Mercury.*—The yellow oxide of mercury owes its introduction into the therapeutics of syphilis to Watrazewski,<sup>2</sup> whose advocacy of its worth has been the means of its adoption in preference to other mercurial preparations. It is the salt to-day most generally used hypodermically, having largely replaced calomel. Watrazewski had used calomel on a large scale, and was led to abandon it by reason of the many drawbacks to its use (see section on Calomel), and chiefly by reason of the intense pain caused by the injection of it, and of the weakness, fever, diarrhœa, want of appetite, and insomnia which it produces. His formulæ are as follows:

No. 1. R.	Hydrarg. oxid. flav.,	1.50 ;
	Acaciæ,	0.30 ;
	Aq. destillat.,	30.00.—M.

No. 2. R.	Hydrarg. oxid. flav.,	1.00 ;
	Acaciæ,	0.25 ;
	Aq. destillat.,	30.00.—M.

He begins with the second or milder solution, and injects a Pravaz syringe-ful. Three to six injections are sufficient for a cure, which, it must always be remembered, means, in the minds of most exploiters of hypodermic mercurial preparations in syphilis, the disappearance of a given set of symptoms or lesions.

The yellow oxide of mercury is promptly absorbed, and its presence can be detected in the urine within a day or two. It seems to linger in the system also, and whereas, many of the mercurial preparations soon disappear from the urine upon the cessation of the injections, when the yellow oxide is discontinued, mercury, according to several observers, may be found in the urine for three weeks or more. The usual claims are

<sup>1</sup> *Op. cit.*, p. 135.

<sup>2</sup> "Ueber Behandlung der Syphilis mit Injektionen von Kalomel und Quecksilbersoxyden," *Wiener med. Presse*, 1886, Nos. 42 and 44; "Ueber die Behandlung der Syphilis mit Injektionen unlöslicher Quecksilber-salze," *Monatshefte für Prak. Dermatologie*, 1887, pp. 989 et seq.; "Étude comparative sur l'Effet thérapeutique des Injections mercurielles insolubles dans la Syphilis et sur les Accidents qui peuvent accompagner leur emploi," *Journal des Mal. cutanées et syphilitiques*, 1890, vol. i. pp. 193 et seq.

made by Watrazewski as to the prompt action, the mild and ephemeral local reactions, and the comparatively rare occurrence of mouth and intestinal complications after injections of yellow oxide.

Many observers have used Watrazewski's salt, and speak in high terms of it, among them Dr. Klotz of New York.<sup>1</sup> Rosenthal<sup>2</sup> endorses its use quite warmly, and considers it next to inunctions in value. This observer used the following formula :

R. Hyd. oxid. flav.,	0.5;
Ol. amygdal. vel olivæ,	15.—M.

Of this the dose is two grammes, injected every eight days into the glutei muscles.

Kuhn<sup>3</sup> put this agent to the test in comparison with calomel. He concludes that it is less active than that of salt, but has the advantage of being less painful, of causing mild and ephemeral indurations, and being attended with no local or constitutional complications. Tchernogüboff<sup>4</sup> employed the yellow oxide, using one or two injections of 2 grains each, into the cellular tissues in early cases, at intervals of eleven days, and in older cases at longer periods. This observer as will be seen, uses large doses, and says that they are beneficial in tertiary syphilis and in early gummata. Men and women, it is claimed, bear these large doses well, and children are said to be benefited by doses of 1 grain. Tchernogüboff thinks this remedy is contraindicated in anæmia, exhaustion, alcoholism, and visceral diseases. Perhaps it may be well to add that any mercurial preparation should be used with great caution in patients suffering from these grave disorders. It is interesting to remember that Lesser<sup>5</sup> observed abdominal pains, vomiting, and bloody and mucoid diarrhoea after injections of yellow oxide, and never after calomel. The conclusion, therefore, is warranted that we can only get at the truth as regards the advantages and drawbacks peculiar to any and all preparations by a study of the experience of many men. It is never well to fully rely upon the assertions of the exploiter of a new mercurial preparation or combination. Thus we find that Dampekoff<sup>6</sup> used the yellow oxide upon 179 syphilitic women, and that neither intense pain nor suppuration was produced. Yet these women absolutely refused to allow the continuation of the treatment by reason of the severity of the pain. Then, on the other hand, Reshetnikoff<sup>7</sup> in the course of 1800 injections of yellow oxide suspended in vaseline oil and made into the gluteal regions, never met with an instance of local suppuration, and only once

<sup>1</sup> *Op. cit.*, p. 99.

<sup>2</sup> "Die Behandlung der Syphilis mittelst Einspritzung, von Hydrarg. oxyd flav.," *Vierteljah. für Derm. und Syphilis*, 1887, pp. 1101 et seq.; and "Allgemeine Gesichtspunkte bei der Behandlung der Syphilis mittelst Quecksilbereinspritzungen," *Ibid.*, pp. 1107 et seq.

<sup>3</sup> "Zur Behandlung der Syphilis mit Injektionen von Hydrarg.-oxyd-flav. im Vergleich zum Calomelöl," *Deut. med. Wochenschrift*, 1888, pp. 635 et seq.

<sup>4</sup> *Transactions of the Third General Meeting of Russian Medical Men*, No. 5, p. 160, St. Petersburg, 1889.

<sup>5</sup> *Op. cit.*

<sup>6</sup> *Dnevnik Kazanskaho Obshtchestva Vratehei*, Jan. and May, 1889, p. 11; and *British Journal of Dermatology*, vol. i., 1889, p. 381.

<sup>7</sup> *Vestnik Obshtch. High. Sudebnoi i Prakticheskoi Meditziny*, Jan., 1889, pp. 1-17; and *British Journal of Dermatology*, vol. i., 1889, p. 349.

saw a diffuse sanguinolent infiltration, which disappeared without any bad result. A quite recent essay on the value of yellow oxide of mercury hypodermically in syphilis is contributed by Selenew,<sup>1</sup> of Stükovenkoff's clinic in Kiew. This observer reaches the conclusion that this treatment is to be preferred to all others as offering a more energetic and more prolonged influence of the mercurial upon the syphilitic virus. Selenew thinks that cerebral lesions, old age, exhaustion, anæmia, and alcoholism are not contraindicating conditions to its use. He noted a mild character in the sequelæ of the injections, and occasionally a mild and ephemeral rise in the temperature.

My own conclusion as to this agent is that in certain exceptional cases, where regional or local mercurial therapy is required, it may be, if used carefully, of decided benefit. I have no leaning to the routine use of any insoluble salt of mercury employed hypodermically.

Many other contributions upon the use of yellow oxide of mercury have been published, but they contain nothing more than has been here presented.

*Black Oxide of Mercury.*—Black oxide of mercury, used largely in homœopathic practice, has been extolled as a remedy for syphilis when administered subcutaneously. Abend<sup>2</sup> used a suspension of this drug in gum and water, employing in all six hundred and eighty-three intramuscular injections, of which two to fourteen are necessary in each case. He noted the early disappearance of secondary and tertiary lesions. Pain and infiltration were moderate, there were no abscesses, and rarely was stomatitis observed.

Hartmann<sup>3</sup> also claims for the black oxide especial advantages. He used the following formula:

R <sub>x</sub> . Hydrarg. oxidi nigri,	1.0;
Glycerinæ,	
Aquæ destillat.	āā. 5.0.—M.

Of this the contents of a Pravaz syringe should be injected into the buttocks.

Hartmann also uses a 10 per cent. oil emulsion. Three to six injections are considered sufficient. They produce some pain, slight irritation, and sometimes stomatitis. It is claimed that this drug is indicated in the treatment of hereditary syphilis.

Watrazewski also used both black and red oxides of mercury in a 10 per cent. gum solution. He found that they exhibited considerable action, comparable to that of calomel, but that they caused less pain than that drug. He thinks that the oxides mix more readily with liquids than calomel. The resulting nodosities are smaller and less lasting than those produced by calomel.

It need only be mentioned that protoiodide of mercury, tannate of mercury, red oxide of mercury, sulphate of mercury, and turpeth mineral have all been tried hypodermically in syphilis, and their promoters

<sup>1</sup> *Meditzinskoïe Obozrenië*, 1890, p. 1; and *British Journal of Dermatology*, vol. ii., p. 190.

<sup>2</sup> "Behandlung der Syphilis durch Subcutanen Injectionen von Hydrargyrum oxydulatum nigrum," *Inaugural Dissertation*, Würzburg, 1887.

<sup>3</sup> "Behandlung der Syphilis mit Injectionen von Hydrarg. oxydulatum nigrum," *St. Petersburg med. Wochen.*, 1890, 3.



have usually found them efficacious. The truth is, that they all come under the head of insoluble salts, and that none of them possess any advantage whatever over calomel, while some are more irritating and others less efficient.

*Cinnabar.*—Cinnabar (hydrargyrum sulphuratum rubrum) is considered by Dr. A. A. Sükhoff<sup>1</sup> of Cronstadt the best mercurial preparation for subcutaneous use. He prefers the so-called artificial cinnabar, a fine bright-red salt, which mixes very evenly with oil of sweet almonds. One drachm of the powder is mixed with an ounce of oil of sweet almonds, and of this one syringeful, representing about one and a half grains of the agent, is injected into each buttock every one or two weeks. The average number of injections required varies between two and ten, and the sojourn of the patients in the hospital averaged between twelve and forty days. Sükhoff claims that these injections are painless, and cause no local or general reaction, and that they are suitable for ambulatory cases. He makes the significant remark that in rare malignant forms of syphilis this agent is less energetic than the classical mercurials.

*Corrosive Sublimate.*—Though Hebra<sup>2</sup> in 1861 employed hypodermic injections of corrosive sublimate upon two cases of syphilis, and Berkeley Hill<sup>3</sup> in 1866 upon eleven cases, it was not until after the appearance of the monograph of Lewin<sup>4</sup> of Berlin upon the subject that this mode of treatment took a prominent place in the therapeutics of syphilis. The first important contribution to this subject published in France was by Liégeois,<sup>5</sup> and after this very many articles appeared in various countries detailing the experience, favorable or the reverse, of different observers. In 1871, I published the results of my experience<sup>6</sup> in the treatment of 50 cases of syphilis by this method, and I have employed it since within the limitations yet to be brought out. From the experience of many observers it is made clear that doses of from  $\frac{1}{12}$  to  $\frac{1}{4}$  of a grain of this salt, dissolved in from 10 to 15 drops of distilled water, injected into the subcutaneous tissues, have a prompt effect upon secondary syphilitic manifestations. Whereas in earlier days the claim was made that this treatment was applicable to all forms and stages of syphilis, the conviction has gradually gained ground that it is a method (valuable in very many instances) of reserve, emergency, utility, or expediency. Thus in cases in which mercury is badly borne by the stomach, and by that method, acts as a depressant and impairs nutrition, it is very common to observe that these injections are well borne, and that an era of improvement is inaugurated. Again, in cases of intestinal disorder, in which pain and diarrhoea always follow the stomach-dose, the subcutaneous injections come to our aid. In many cases when

<sup>1</sup> "Treatment of Syphilis by Injection of Cinnabar," *Protok. Rusch. Sij i Dermat. Obst. St. Petersburg*, 1890, iv. 51-57.

<sup>2</sup> "Ueber die Behandlung der Syphilis," *Allgemeine Wiener med. Zeitung*, July 23, No. 30, 1861.

<sup>3</sup> "Subcutaneous Injection of Mercury in Syphilis," *Lancet*, May, 1866.

<sup>4</sup> *Behandlung der Syphilis, mit subcutanen Sublimat-injectionen*, Berlin, 1869.

<sup>5</sup> "Des Resultats cliniques et scientifiques obtenus avec les Injections sous-cutanées de sublimé a petites doses," *Annales de Derm. et de Syph.*, tome 2, 1869-70, pp. 1, 90, and 272.

<sup>6</sup> "On the Treatment of Syphilis by the Hypodermic Injections of Corrosive Sublimate," *Medical Gazette*, May 13, 1871.

by stomach ingestion a mild or severe stomatitis or salivation is produced, or when local medication is powerless, the substitution of hypodermic injections will often be followed by full toleration of the drug. The injections are often of much value in local and regional therapy, as, for instance, in cases of localized syphilitic neoplasms, resisting internal treatment, in eye, ear, and cerebral affections, and hyperplasia of the lymphatics and the ganglia. In the past few years I have observed much benefit from the hypodermic injection of corrosive sublimate in patients who were suffering from the grip, and in whom the secondary manifestations of syphilis coincidentally showed themselves. In many of these cases mercury by the stomach was badly borne and produced debility and great nervousness; in others the stomach was fully taxed by the antigrip remedies; and in still others it seemed to have no effect. In these conditions I resorted to the sublimate injections, with a promptly beneficial effect and ultimate good results upon the syphilitic diathesis. It is well to bear these facts in mind, for they will be the means of helping many a sorely-tried patient over some very rough spots.

In many cases of secondary syphilis it will happen that by reason of colds, of intercurrent acute affections of the throat, lungs, liver, and intestines, and of gastric derangements, mercury by the mouth is temporarily contraindicated; and in these exigencies a resort may be had to hypodermic medication. Patients sometimes become tired and complain of the dosing by pills, and circumstances do not favor the use of inunctions or fumigations; and in these cases very often quiet and contentment may be produced by using the mercury subcutaneously. In some cases, happily rare, the evolution of the secondary period of syphilis is ushered in with fever and deep debility and malaise; in fact, a pseudo-typhoid state is produced. In such cases there is very often stomach intolerance of mercury, and the patient is too weak to stand mercurial inunctions. In this emergency we can use hypodermic injections of sublimate with confidence, and employ the stomach for symptomatic remedies. Even at this late day I think I can do no better than quote in the main the conclusions—somewhat modified and elaborated, however—which I reached upon this subject in 1871. They are as follows:

1. That the use of bichloride of mercury by hypodermic injections, though a method of treatment possessing certain advantages, is for various reasons of limited application.
2. It is useful in the whole secondary period of syphilis, in roseola, in the papular syphilides, and in the small miliary pustular syphilide. Its action upon newly-appearing syphilides is sometimes almost marvellous. This effect is always strikingly well marked upon lesions in the vicinity of the injections, which disappear in a few days. Thus in cases of disfiguring and compromising syphilitic eruptions on the face, neck, or hands, these injections made as near as possible to the seat of the lesions, will always bring about a prompt and satisfactory result. When syphilides have grown old, they are often slow to yield to these injections, which have little if any effect upon scaling lesions, whether of early or late evolution.
3. It very rapidly cures all syphilitic neuroses, cephalalgias, pleurodynias, and angina, even when they are slow to yield to the internal use of mercury and morphine.
4. In the cachexias of syphilis, early and late, and in the anaemia with concomitant gastric weakness,

these injections, used for a time as a treatment of utility, will prove very efficacious. 5. It possesses no advantages over other methods in the treatment of mucous patches and condylomata lata, or in the hard œdema accompanying primary or secondary lesions. 6. It may be beneficial in the mild and even severe forms of cerebral and spinal lesions, in combination with iodide of potassium internally, particularly in those cases in which the use of mercurial frictions is for any reason impossible. Under like conditions in eye and ear syphilis these injections may be resorted to. 7. In the early tertiary lesions, and even in the late forms if not of an ulcerated character, these injections are often beneficial, but they then require the internal use of the iodide of potassium as an adjuvant. 8. This treatment is frequently well borne by men, but is much objected to by women as a rule, and in children and infants it is contraindicated except under conditions of severe emergency.

Rosolimos,<sup>1</sup> who has used sublimate injections upon a large scale, calls attention to a fact which I have also observed—namely, that the method is often extremely efficacious in cases of buccal lesions without the aid of topical treatment. He attributes this efficient action not only to the curative influence of the injections, but also to the fact that they very rarely, if ever, cause stomatitis or any form of mouth lesions, which so often lead to the development of syphilitic processes on these parts.

It is of the utmost importance that the patient should be not only intelligent, but at the same time impressed with the gravity of his disease, in order that he may comprehend the advantages he is to derive, otherwise he will not submit to the pain and inconveniences of the treatment. In some cases in private practice the treatment is inadmissible by reason of the cost of the frequent injections. In dispensary practice patients soon tire of this treatment, and they fail to appear for its continuance. It is well, therefore, for physicians not to put down in their records cases as being cured for the reason that they did not come back, since it is very probable that they may have sought other and more agreeable methods of treatment.

Within the limits of expediency, emergency, and utility these injections possess the advantages of smallness and precision of dose and ease of administration, a promptly satisfactory therapeutic action, and the absence of systemic disturbance.

The quantity of mercury for initial injections should be about  $\frac{1}{10}$  or  $\frac{1}{8}$  of a grain of the sublimate for persons in good health. In weakly individuals  $\frac{1}{12}$  of a grain may be used. Therefore it is well to have several solutions on hand, always in small quantity, kept in a cool place and secluded from the light. After many years' experience I have reached the conclusion that 10 or 12 drops of water are sufficient for the amount of injection fluid. Thus we may have a solution in which  $\frac{1}{10}$  of a grain of sublimate is dissolved in 10 drops of water, another of  $\frac{1}{8}$  of a grain in the same quantity, and for exceptional instances  $\frac{1}{6}$  or  $\frac{1}{4}$  of a grain to the same amount. As a rule, it will be found that as an all-around solution the one containing  $\frac{1}{8}$  grain to 10

<sup>1</sup> "Les Syphilides secondaires de la Bouche, traitées par les Injections mercurielles," *Annales de Derm. et de Syph.*, 1888, pp. 525 et seq.



drops will be the most used and the most effective. For a few injections a greater strength may be required by reason of emergency or the severity of symptoms, and in most instances benefit will result. These solutions must be made with great care and with distilled water, and then they should be filtered. Whenever they show signs of turbidity they should be rejected.

White<sup>1</sup> of Guy's Hospital has reported his marked success in the treatment of syphilis of the nervous system with the sublimate injection. He first injects deeply into the gluteal muscles  $\frac{1}{8}$  of a grain of muriate of morphine, then, withdrawing and recharging the syringe, he injects  $\frac{1}{8}$  of a grain of the mercurial. He speaks of one case in which daily injections for nearly ten weeks were made. In this connection it should be remembered that by such a treatment we are liable to induce a craving for morphine. It is always better for the patient to stand the pain.

Cruyl<sup>2</sup> has modified the use of sublimate hypodermically by using olive oil as the means of suspension. A given quantity of sublimate is dissolved in ether, and then incorporated with the oil. The dose is the same as in watery solutions. No bad effects are produced by these injections.

A further modification of the sublimate treatment is in the form of emulsions with vaseline oil, which Tchistiakoff<sup>3</sup> considers very valuable in severe cases, and not attended with bad results. This same observer has made a number of experiments<sup>4</sup> in order to find a combination with sublimate which does not give rise to pain, and concludes that the following combination answers the purpose well:

Ry. Hydrarg. chlorid. corros.,	gr. x;
Aquæ destillat.,	ʒj;
Acidi tartarici,	ʒss.—M.

*Method of Injection.*—The syringe should be made of India-rubber, and should hold 10 or 12 drops, or if larger should be accurately gauged for those amounts. The needles should be of very fine calibre, of steel, and fully an inch and one-eighth or one-quarter long. The greatest care should be taken to keep the syringe and needles (for it is well to have quite a number) in a state of perfect cleanliness and removed from any chance of dust contamination. When the syringe is charged with the sublimate solution and the needle is affixed, the instrument should be placed in a saucer or tray containing a 5 per cent. carbolic solution. In the operation the utmost asepsis should be aimed at, and the injected part should be carefully washed with soap and water, and after that sopped and wiped with carbolic water (5 per cent.). The skin being pinched up in a fold, the needle is to be pushed gently, slowly, but firmly deep into the subcutaneous connective tissues, and then the fluid is to be expelled slowly and with care, in order that the tissues may not be bruised more

<sup>1</sup> "On the Treatment of Syphilis, especially of the nervous system, by the Subcutaneous Injection of Perchloride of Mercury," *Lancet*, June 6, 1891.

<sup>2</sup> "Une Nouvelle Injection mercurielle sous cutanée," *Annales de Derm. et de Syph.*, 1890, p. 35.

<sup>3</sup> *Transactions of the Third General Meeting of Russian Med. Men in St. Petersburg*, 1889, No. 5, p. 158.

<sup>4</sup> *Voënnno-Meditsinsky Jürnal*, No. 28, 1889, p. 456.

than necessary. Slight massage over the injection will aid in its diffusion into the tissues. It must always be borne in mind that the fluid should not be thrown into the deep parts of the derma proper, for the reason that if there deposited it is very prone to produce an eschar, which will result in the destruction of the whole thickness of the skin. Then, again, great care must be exercised that the point of the needle is not lodged in a vein, in which case dizziness, syncope, a feeling of suffocation, pain in the heart and lungs, and other alarming symptoms will be observed. To avoid this accident the surgeon must watch the piston of the syringe while he is injecting. If there is a moderate but mild resistance to the injected fluid, as will be the case if the tip is in the subcutaneous tissues, he may know that he is all right. If, however, the injection seems to pass out of the syringe without any or with very little resistance, there is fear that the tip is in a vein. Under these circumstances it is well to push down farther or withdraw the needle a little until the normal resistance shall be felt, and then no untoward symptoms will threaten. A very moderate amount of practice in the use of hypodermic injections will teach the surgeon to know when he is in danger of doing harm.

Various—indeed almost all—parts of the body have been selected for this method of treatment. The arms and legs have been used and abandoned, for the reason that much discomfort, pain, and muscular inability is generally produced. The back in a line from the shoulders to the hips, at a distance of about six inches on either side of the spinal column, was utilized by Lewin, and may occasionally be used when other parts fail to offer a proper site for injections. It is always important, when using any form of subcutaneous injection of mercury, to avoid parts liable to be compressed over bony ridges or prominences, or where extra pressure of the garments is exerted. After many years' experience I have come to look upon the gluteal regions as the most advantageous sites for mercurial injections. Smirnoff first called attention to the depressions just behind the great trochanters as eligible sites for injections, and I think that no parts of the body lend themselves to our purpose as well as these. Injections made here, as a rule, cause little if any pain and but small and ephemeral nodosities. In this region quite a number of injections may be given, and in most instances sufficient surface is offered for the requisite injection-treatment. We can resort also to the hypogastric regions and to the parts near the inguinal lymphatics, above and below; but whenever the upper parts of the thighs are used great care must be exercised, in order that we can continue the treatment. As it is very often important to act locally upon lesions of the penis and of the lymphatics arising therefrom, we may have to utilize the tissues in their vicinity. It must always be remembered that injections should not be made into the *mons veneris* or under the skin of the penis. The region of the neck, particularly its back portions, may be used in some extreme cases requiring local or regional therapy. Care must be exercised that vessels and nerves are not punctured or injured. Whenever mercurial injections are employed for localized deposits of new growths, the anatomical peculiarities of the parts must be taken into consideration.

As a rule, the injection of  $\frac{1}{8}$  or  $\frac{1}{6}$  of a grain of sublimate every second

day will be attended with no bad or annoying results, and even a daily injection may be well borne and may produce good results. No absolute rule can be given as to the dose or its frequency. As has already been said, each case is a problem, and when treated with injections, as with all methods of antisyphilitic therapy, it must be carefully watched. If the general condition of the patient is improved, if his lesions show signs of yielding to treatment, and if the annoyances and discomforts of his disease are ameliorated, the physician may be assured that he is on the right track, and he can increase the dose or the frequency of the injections according to the indications presented. It is astonishing how seldom stomatitis or intestinal troubles are produced even when massive doses of the sublimate are injected.

The unpleasant local effects are as follows: Pain at the point of puncture; pain at the site of the injection; an erythematous condition of the skin, with heat and itching or burning; infiltration in the subcutaneous tissues and localized firm nodosities.

The pain at the point of puncture is usually trifling, and is seldom seen in this era of asepsis.

The pain at the site of the injection may be severe, and even lasting in some few instances, but as a rule it ceases in a few hours. It may last one or more days, and give way to a sensation of tenderness and soreness of varying degrees. In many cases it will be observed that pain is felt after the first few injections, and that thereafter it is not complained of. The temperament of the patient in this ordeal, as in disease in general, has much to do with the presence or absence of pain following injections.

An erythematous halo of greater or less extent may often be observed even when the utmost care has been taken with the injection. As a rule, this hyperæmia is slight and ephemeral, and causes little annoyance. In some cases the redness is deep and the burning and itching are severe. It is a condition readily cured by rest and cooling lotions.

Infiltration into the subcutaneous tissues may be of various grades of severity. In somewhat exceptional cases it presents many of the objective features of erythema nodosum. We may also find more or less extensive induration of a brawny character, which may be painful or the reverse. In some instances prompt involution occurs, and in others the thickened condition is very persistent, so that patients present large surfaces of skin the seat of brawny swelling and thickening. The nodosities are usually the sequelæ of diffuse infiltrations. In some cases each injection gives rise to a localized margined subcutaneous tumor which presents a feeling of firm structure. These nodosities remain in an indolent condition for a time, and then disappear.

In the sense in which we understand the abscesses which follow calomel injections, it may be said that these complications are not observed in sublimate injections. During more than twenty years I have seen but two, or perhaps three, subcutaneous abscesses. They are certainly of great rarity. I have seen in my own practice and in that of another surgeon a localized gangrene of the skin occur in consequence of the injection not having been thrown into the subcutaneous tissues, but rather into the deep parts of the derma. In these cases the whole skin for an area corresponding to the extent of the injection is killed. The process of decay is a rather slow one, and the morbid tissue is thrown off and a



clearly punched-out wound is left. With ordinary care this troublesome accident may be avoided.

*Intravenous Injections of Bichloride of Mercury.*—The latest modification of the injection-treatment is that of Baccelli,<sup>1</sup> who advocates the injection of the solution directly into the veins. He was so successful in the treatment of malaria by the intravenous injection of quinine that he was led to try the method in the treatment of syphilis. As usual when a new fad is exploited, the results are not less than brilliant. This treatment has the endorsement of W. L. Pyle.<sup>2</sup>

In this connection it is well to remember that Ullmann<sup>3</sup> has reported some experiments upon the lower animals in which he injected mercurial salts into their veins, and produced death particularly promptly when he used the bichloride. It will be well to think twice before resorting to this dangerous procedure.

*Sal alembroth*, the double chloride of mercury and ammonium, was introduced into the therapeutics of syphilis by Bloxam<sup>4</sup> of London as being preferable to all other mercurial preparations for hypodermic use. The solution found by the author most efficient was one which did not contain an excess of chloride of ammonium, and was made by dissolving 32 grains of sublimate and 16 of chloride of ammonium in sufficient water to make 2 ounces. The dose of this solution, which is not liable to decompose, is 10 minims, and it should be injected deep into the glutei muscles once a week. By this agent the author claims that he has been very successful in the treatment of syphilis, using the injections weekly, bimonthly, and monthly for a period of eighteen or twenty-three months.

*Composite Preparations of Mercury.*—Early in the history of sublimate injections efforts were made to obtain a salt or a combination which should be so bland as to cause no pain or irritation, and which would be more promptly absorbed and readily assimilated than the bichloride. The search for this panacea began in 1871, and it still continues. To Staub<sup>5</sup> may be given the credit of first proposing a chloro-albuminous solution of mercury. He used the following formula:

R <sub>y</sub> . Hydrarg. bichlor.,	1.25;
Ammon. chlor.,	1.25;
Sodii chlor.,	4.15;
White of one egg.	
Distilled water,	250.00.—M.

Secundem artem.

Staub's fluid was not used largely, even in France, where the bichloride solution was preferred. In 1876, Bamberger<sup>6</sup> introduced an

<sup>1</sup> *Gaz. Med. Roma*, vol. xix., 1893, pp. 241 et seq.

<sup>2</sup> *Med. News*, Feb. 23, 1895.

<sup>3</sup> *Annales de Derm. et de Syph.*, 1895, p. 67.

<sup>4</sup> "On the Intramuscular Injection of Mercury in Syphilis," *Lancet*, April 28, 1888; and "On Syphilis and its Treatment," *ibid.*, May 5, 1888.

<sup>5</sup> *Traitement de la Syphilis par les Injections hypodermique de Sublimé à l'état de Solution chloro-albumineuse*, Paris, 1872.

<sup>6</sup> "Ueber Hypodermatische Anwendung von löslichen Quecksilber-albuminat," *Wiener med. Wochenschrift*, No. 11, 1876; and "Nachträgliche Bemerkung über die darstellung der löslichen Quecksilber-albuminat," *ibid.*

albuminous mercuric compound which was largely used, and is even employed at this time. Bamberger's solution is made as follows: To 100 c.c. of a filtered solution of white of egg (containing 40 c.c. of albumin and 60 c.c. of water) there are added 60 c.c. of a solution of mercuric chloride (containing 5 per cent. or 3 grm. Hyd. Cl<sub>2</sub>) and 60 c.c. of a solution of sodium chloride (containing 20 per cent.); finally, 80 grm. of distilled water are added, which brings the bulk of the solution up to 300, containing 0.010 sublimate in every cubic centimetre. Upon the hypothesis that in stomach ingestion sublimate is first converted into an albuminate, which in its turn is readily absorbed, Bamberger's fluid was accorded an extensive use in Germany. But by reason of the more or less prompt deterioration of this fluid (in its becoming turbid and precipitating a white substance consisting chiefly of calomel) it gradually fell into disfavor—a result which was accelerated by the fact that its injection produced nearly if not as much pain as the sublimate injections. I used this solution in many cases over a considerable period of time, and abandoned it by reason of the uncertainty of the dosage from precipitation, and from the fact that it possessed no advantage over the sublimate solution. My colleague, the late Dr. Bumstead, reached a similar conclusion.

With the death of the mercuric albuminate, phoenix-like a new preparation was heralded. For this therapeutic novelty the world is indebted to the late L. Martineau<sup>1</sup> of Paris, who in season and out of season, wrote in journals and in societies spoke words of praise about his *peptone mercurique ammonique*. According to this enthusiastic physician, the syphilitic panacea had at last been found, which was readily absorbed, caused no pain or inconvenience, and cured promptly every case. The formula of the preparation is as follows:

R̄. Hydrarg. bichlor.,	10;
Peptone dry (Catillon),	15;
Ammon. chlor.,	15.—M.

One gramme of this preparation contains 25 centigrammes of sublimate. It was diluted in water alone and in a mixture of water and glycerin, and was injected in doses of from  $\frac{1}{4}$  of a grain upward. Though so much vaunted, the preparation was not largely used, and since the death of its introducer it has passed into the limbo of therapeutical curiosities.

A number of observers have also published papers on peptone-mercury in various forms and modifications in syphilis. Though numerous, these essays contain nothing worth recording, and they themselves may well be speedily forgotten.

*Hydrochloric Glutin-Peptone Sublimate*.—This newly-elaborated compound has been recently much praised by Hüfler,<sup>2</sup> who contends in favor of soluble preparations of mercury for hypodermic use in syphilis.

<sup>1</sup> "Des Injections sous cutanées de Peptone mercurique Ammonique dans le Traitement de la Syphilis," *Union médicale*, 1881, 3d series, vol. xxxiii. pp. 97, 125, 136, 149, 174 and 186; and "Leçons sur la Thérapeutique de la Syphilis," *La France médicale*, 1882, tome 2, Nos. 27 to 34.

<sup>2</sup> "Ueber die Behandlung der Syphilis mit Salzauren Glutinpeptone Sublimat (nach Dr. Paal)," *Therap. Monatshefte*, Sept., 1890, pp. 437 et seq.

In Strumpell's clinic sixty patients were treated by this new compound. It is claimed by Hüfler that the remedy is prompt and efficient, that it causes no local reaction, and that relapses are no more frequent than when other treatments are followed. It may be remarked that such polypharmaceutic refinements as the one just mentioned should be looked upon only as therapeutical curiosities, to be used by those seeking novelty rather than true scientific results. This preparation is said to have been patented by its inventor, Dr. Paal. It is scarcely probable that he will be annoyed with the prosecution of many infringement suits.

Bockhart<sup>1</sup> introduced into medicine a preparation which he calls blood-serum mercury, which he thinks is better than any other combination of mercury and albumin. It is, he claims, of fixed composition, and when injected under the skin causes little if any pain or inconvenience, even when injected into the thighs. It is prepared as follows from the blood of sheep, horses, or oxen:  $10\frac{1}{2}$  drachms of blood-serum, sterilized after Koch's method, are placed in a graduated glass, and then mixed with a solution of 45 grains of bichloride of mercury dissolved in 1 ounce of boiling distilled water. The precipitate formed is redissolved by the addition of 105 grains of chloride of sodium dissolved in 5 drachms of distilled water. This compound is then a 3 per cent. solution of blood-serum mercury. By adding enough distilled water to make the whole measure 6 fluid ounces and 5 drachms we have the solution generally used, containing  $1\frac{1}{2}$  per cent. of the mercurial salt. In every detail of preparation the most scrupulous care must be taken to preserve an aseptic condition. Fifteen minims of this solution contain  $\frac{1}{4}$  of a grain of sublimate combined with albumin. Injections should be made daily or every second day. This liquid is of a yellowish opalescent color, and shows little tendency to decomposition if kept in a dark bottle in a cool place.

Bockhart employed this preparation in many cases of early syphilis, of condylomata, gumma of the tongue, gumma of the skin, of syphilitic ozœna, and of scaling syphilitic eruptions of the palm, and found excellent results. Lipp, however, thinks that the remedy is less efficacious and more painful and uncertain in its action than the utterances of Bockhart would lead us to expect. Hallopeau<sup>2</sup> says that the experiments made with this preparation at the Hôpital St. Louis did not realize his expectations. All the patients thus treated complained so bitterly of the pain produced that the remedy was of necessity given up. Róna,<sup>3</sup> on the other hand, though he concedes that the remedy has some drawbacks in the way of local and general reaction, thinks that it is a valuable one and worthy of trial.

*Cyanide of Mercury* was brought prominently forward by the late Tilbury Fox<sup>4</sup> as a very efficient and satisfactory preparation in the treatment of syphilis; and it has again recently been advocated as a most excellent antiseptic by Chibret.<sup>5</sup> Fox employed it in the form of pills, with

<sup>1</sup> "Blut-serum-Quecksilber, ein neues präparat zur Injections-behandlung der Syphilis," *Monatshefte für Praktische Dermatologie*, 1885, No. 5, pp. 137 et seq.

<sup>2</sup> *Revue des Sciences médicales*, vol. xxvii. 1886, p. 241.

<sup>3</sup> "Blut serum Quecksilber (Bockhart) gegen Lues," *Monatshefte für Prak. Dermat.*, June, 1886, pp. 287 et seq.

<sup>4</sup> *Skin Diseases*, London, 1873, pp. 306 and 307.

<sup>5</sup> "Etude comparative des pouvoirs Antiseptiques du Cyanure de Mercure, etc.," *Compt. rendus de l'Acad. des Sciences*, Paris, 1888, cvii. 119.



the initial dose of  $\frac{1}{20}$  of a grain thrice daily. This agent was first employed by the hypodermic method by Cullingworth,<sup>1</sup> who reached the conclusion that it was superior to the sublimate by reason of the mildness of pain and of local reaction and of its stability in solution. Therapeutically, he found it very efficient, and employed the following formula:

Ry. Hydrarg. bicianidi,	gr. xij ;
Glycerinæ,	℥ss ;
Aquæ destillat.,	ad ℥iv.—M.

The medium dose was 10 drops ( $\frac{1}{16}$  grain), injected every day, but double the quantity can be used in appropriate cases under careful surveillance.

This agent was not extensively adopted as an antisyphilitic remedy, and little was then heard of it until the year 1876, when Sigmund<sup>2</sup> praised it, and placed it next to sublimate and calomel in its potency. This observer regarded it as beneficial in mild cases, and noticeable for its slight disturbance of the tissues after injections. Sigmund's opinion was endorsed by Mandelbaum<sup>3</sup> of Odessa, who regarded it as a good remedy in public practice for many reasons, particularly its cheapness. It would seem that in Mandelbaum's experience this agent causes pain, for he has since published a formula which contains cocaine, as follows:

Ry. Cocaini muriat.,	0.05 gm. ;
Hydrarg. bicianidi,	0.01 “
Aquæ destillat.,	1.00.—M.

This quantity is sufficient for one injection.

As showing how one man's experience in the use of a drug is diametrically opposed to that of another, it is interesting to give the views of Güntz<sup>4</sup> of Dresden upon the effects of the cyanide hypodermically used. This observer says that the solution is very unstable and should be used up quickly, and that its use causes much pain, vertigo, noises in the ears, nausea and syncope. It is very probable that he selected for his injections places which are particularly sensitive, and that when he observed syncope, etc., these alarming symptoms were due to the fluid being injected directly into a vein. Güntz convinced himself of the very rapid action of the remedy, and that by its hypodermic use salivation might be induced. The infiltration of the skin was less than after the employment of the bichloride.

Cyanide of mercury was first used in syphilitic eye affections by Galewowski,<sup>5</sup> who injected from 5 to 10, and even 15, milligrammes in men. The author reports cures in seven cases of iritis with interstitial infiltra-

<sup>1</sup> "On the Subcutaneous Injection of Mercury," *Lancet*, vol. i., 1874, May 9, 16, and 23.

<sup>2</sup> *Op. cit.*

<sup>3</sup> "Ueber die Behandlung der Syphilis mit Subcutanen Injectionen von Bicyanuretum Hydrargyri," *Vierteljahr. für Derm. und Syphilis*, 1878, 201 et seq.; and "Kokain als Schmerzstillendes Mittel bei der Hypodermatischen Syphilis Behandlung," *Monatsshefte für Prakt. Dermat.*, vol. vi. pp. 241 et seq.

<sup>4</sup> "Ueber Subkutane Injectionen von Bicyanuretum Hydrargyri bei Syphilitischen Erkrankungen," *Wien. med. Presse*, 1880, xxi. pp. 563, 598.

<sup>5</sup> "Des Injections hypodermiques du Cyanure de Mercure dans la Syphilis oculaire," *Progrès médical*, April 15, 1862, pp. 279 et seq.

tion into the cornea, iritis and condylomata, iritis and keratitis punctata, irido-choroiditis, interstitial keratitis, and neuro-retinitis. Isolated cases in support of Galezowski's claims have appeared from time to time in medical journals.

It is needless to mention a number of papers published within the last ten years upon the therapeutic effects of this drug, since they all, in the main, endorse what has already been said. The most important recent paper is by Boer<sup>1</sup> of Berlin, who used the cyanide upon thirty cases of syphilis in men and women, and who thinks that it has an antibacterial action. Besides its promptness of action and mild local irritating effect, Boer thinks the cyanide beneficial for the following reasons: 1, it does not coagulate albumin, and has a neutral or alkaline reaction; 2, it is less irritating than sublimate; 3, and does not become decomposed by light.

*Iodo-Tannate of Mercury* was prepared by Nourry<sup>2</sup> with the idea of obtaining a preparation to which the stomach is not intolerant. Dujardin-Beaumetz, who tried this salt in practice, thinks that it fulfils the hopes of its inventor. It is used hypodermically in the following solution:

R. Hydrargyri,	gr. $\frac{1}{8}$ ;
Iodini,	gr. $\frac{9}{10}$ ;
Acid. tannic.,	gr. $\frac{3}{5}$ ;
Glycerinæ,	℥ 15.—M.

This quantity is said to be rather too large, and liable to produce salivation, therefore but half of it should be used.

Its action is said to be very rapid, and the injection is attended with neither pain, nodosities, nor abscesses.

*Bichloride of Mercury and Potassium*.—This compound was first used hypodermically by Aimé Martin,<sup>3</sup> who used the following formula:

R. Hydrarg. biniodidi,	.4;
Potassii iodidi,	.4;
Aquæ destillat.,	3j.—M.

Of this solution as much as half a drachm was injected at a dose. Martin described a severe case of generalized syphilides, which had been treated in vain for two years, which was cured by two of these injections. In the second case syphilis had existed for six months and was rebellious to mercury by the mouth. The usual dermal, mucous, and glandular lesions were promptly caused to disappear by one injection.

Bricheteau<sup>4</sup> considered that the iodide of potassium is irritant to the tissues, and after many experiments adopted a formula containing the

<sup>1</sup> "Injectionen von Quecksilber Oxycyanid gegen Syphilis," *Therapeut. Monatshefte*, 1890, pp. 332 et seq.

<sup>2</sup> "Sur les Injections hypodermiques à l'Iodo-tannate d'Hydrarg. soluble," *Bull. gén. de Thérapeutique*, 1888, pp. 364 et seq.

<sup>3</sup> "Sur l'Emploi des Injections hypodermiques d'Iodure de Mercure et de Potassium, dans le Traitement de certains accidents de la Syphilis secondaire et tertiaire," *Gazette des Hôpitaux*, Sept. 12, 1868.

<sup>4</sup> "On the Application of the Hypodermic Method to the Treatment of Syphilis by Mercury," *Practitioner*, vol. ii., 1869, pp. 141 et seq.; and *Bull. gén. de Thérapeutique*, vol. lxvii., 1869, pp. 297 et seq.

double iodide of mercury and sodium, which he thought free from that objectionable quality. His formula was as follows:

Ry. Double iodide of mercury and sodium, gr. xxij;  
Distilled water, ℥ij.—M.

The dose by hypodermic injection is 10 drops, which may be increased to 20. The author advises the use of this formula in cases where rapidity of action is necessary, as in iritis and severe cases of syphilis.

THE SO-CONSIDERED ANTISEPTIC GROUP.—*Salicylate of Mercury*.—Introduced into pharmacy by Lajoux and Grandval in 1881, salicylate of mercury was first recommended as an antisiphilic remedy by Silva Araujo<sup>1</sup> in 1887, and since that date it has been used by a number of observers, who claim for it exceptional merit. It is used in pill form, and in suspension it is injected into the muscles.

It is claimed for this remedy that it is much more promptly absorbed than any other mercurial preparation; that it is well borne by the stomach, does not produce gastro-intestinal disturbances or diarrhoea; and that it rarely, if ever, causes stomatitis. Used by stomach ingestion, salicylate of mercury may be given in pill form in doses of from  $\frac{1}{4}$  to  $\frac{2}{3}$  of a grain three times daily. If very prompt action is desired, the large dose of 1 grain three times daily may be administered, but Szadek says that if pushed too vigorously the remedy may cause intolerance on the part of the stomach. In doses of 2 grains daily it has been used with benefit for periods of from two to three months, without any cause for interruption. It is claimed to be of especial benefit in the early secondary period, of the lesions and symptoms of which it causes involution and disappearance. In relapsing secondary lesions of the skin and mucous membranes it also proves very effective. In late tertiary forms of syphilis, particularly those affecting the skin, it is also claimed to act promptly and efficiently.

Salicylate of mercury has been used in the form of subcutaneous and intramuscular injection by a number of observers, notably by Szadek.<sup>2</sup> The latter uses the following solution:

Ry. Hydrarg. salicylat., gr. xvj—xxiv;  
Mucil. acaciæ, gr. viij;  
Aquæ destillat., fʒvss.—M.

The dose of this liquid is the contents of a Pravaz syringe, which may be administered into the gluteal region beneath the muscular fasciæ every third day. The number of injections used in various cases was from four to twelve. Epstein employed this salt in oil emulsion, and Hahn in suspension with vaseline oil. When used in the form of an injection it is claimed that little harm is produced, that the local reactions are much less severe than by the use of other mercurial salts, and that the resulting nodule gives little inconvenience and is soon absorbed. Jadassohn and

<sup>1</sup> "Du Traitement de la Syphilis par le Salicylate de Mercure," *Bull. gén. de Thérapéut.*, Paris, 1888, cxiv., pp. 175 et seq.; and "El Salicylato de Mercurio y sus Aplicaciones en la Sifilis y en Algunas Dermatitis," *Revista de Medicina y Farmacia*, 1887, ii. 2, pp. 12 and 14.

<sup>2</sup> "Ueber behandlung der Syphilis mit Intra-musculären Injectionen von Quecksilbersalicylat," *Wien. klin. Wochenschrift*, No. 13, 1890.



Zeissig, Welander, Petersen, Tschistiakoff, and others speak in praise of this mercurial salt.

It is interesting to note that Touton<sup>1</sup> reports the case of a man in whom zoster femoralis followed the third injection of salicylate of mercury. Touton is of the opinion that this skin lesion was of reflex origin, and due to trauma of a nerve. This may be considered a very unusual complication of hypodermic medication in syphilis.

*Carbolate or Phenate of Mercury* was introduced into the therapeutics of syphilis by Gamberini,<sup>2</sup> who regards it both as an effective form of mercury and as being valuable by reason of the supposed antimicrobial action of the carbolic acid. This salt belongs to the group of mercurial compounds which have been prepared and exploited as possessing a distinct antimicrobial effect—a group which is composed of the thymolate, the benzoate, and the salicylate. It is well known that we are wholly lacking in positive knowledge of any micro-organism of syphilis; consequently the claim that an agent possesses a specific parasitocidal effect on the disease is based on pure assumption. This particular preparation is claimed to be as potent as any other mercurial preparation. Carbolate of mercury may be given in pill form, each pill containing one-sixth of a grain of the salt covered with gelatin or balsam tolu. The dose at first is two pills daily, which may be increased to six pills. In some cases six pills produced mild gastro-enteritis, and in one case the remedy was abandoned on account of intestinal colic. In two cases of papular syphilides  $\frac{1}{6}$  of a grain of this salt, dissolved in 15 drops of water, was injected during a period of two months without good results. In the hospital at Würzburg this preparation was tried by Happel.<sup>3</sup> He injected about one-third of a grain every day or two, using on an average fifteen injections. He saw no abscesses and very slight nodules. In a few women malaise, headache, and chills were produced.

This new remedy was (as might be supposed) tried by Szadek,<sup>4</sup> who was well pleased with its action in pill form in mild cases and in relapses, administered to adults and young infants. By hypodermic injection into the subcutaneous tissues and the muscles he also used it with gratifying results. He found that it was readily absorbed, and that the injections caused little local and rarely any general disturbance.

Lexer<sup>5</sup> made comparative studies of the effects of injections of various mercurial preparations, and arrived at the following results: That relapses occurred after inunctions in 9 per cent.; after sublimate, in 13; after the salicylate of mercury, in 15; after formamide, in 16; after the peptonate, in 16; after the gray oil, in 16; after the tannate, in 18, and after the carbolate, in 27 per cent. By this showing the carbolate of mercury is among the least efficient of mercurial preparations.

<sup>1</sup> "Zoster femoralis im Anschluss an eine intra-musculäre Salicylquecksilber Injection," *Archiv für Derm. und Syph.*, 1889, pp. 775 et seq.

<sup>2</sup> "Il Phenato di Mercurio, nuova medicamentum per la cura della Sifilide," *Giornale delle Malat. Vener. e della Pelle*, 1886, p. 241.

<sup>3</sup> "Die Behandlung der Syphilis mit Subcutanen Injectionen von Hydrargyrum Oxydatum Carbolicum," *Inaug. Dissert.*, Würzburg, 1888.

<sup>4</sup> "Innerliche Anwendung des Hydrargyri Carbolicum Oxydati bei Syphilis," *Monatshefte für Prak. Dermat.*, 1887, pp. 195 et seq., and "Ueber hypodermatische Anwendung von Hyd. Carbol. Oxydat. bei Syphilis," *ibid.*, 343.

<sup>5</sup> "Beitrag zur Beurtheilung der Werthes der Verschiedenen Quecksilber präparate in der Syphilis-therapie," *Archiv für Derm. und Syphilis*, 1889, pp. 715 et seq.

De Luca<sup>1</sup> also experimented with this salt, of which he administered pills containing about  $\frac{1}{3}$  of a grain three to six times a day. The results were no better than those of other mercurial preparations, and were comparable to those of the tannate of mercury. Diarrhœa and intestinal pains were noted in some cases.

It must be remembered that the carbolate, the bicarbolate, or diphenate of mercury, above considered, must not be confounded with diphenyl mercury, which is a deadly poison.

Szadek<sup>2</sup> also used the carbolate of mercury by injections into the subcutaneous tissues and muscles in the form of a 2 per cent. solution in water and gum arabic. He states that no pains were produced, but sometimes the muscles became stiff after the injections. Complications are very rare, and the action of the drug is rapid. Ten injections are usually necessary. Troitzky, who took part with Szadek in these experiments, entertains the latter's views as to the efficacy of the mercurial agent.

A survey of the results thus far experienced in the use of this remedy convinces me that it has no striking qualities, and that it is not to be preferred to the classic preparations.

*Thymolate of Mercury* (hydrargyrum thymolo-aceticum, Merck) is an insoluble salt which was first used in the treatment of syphilis in Neisser's clinic, the details of which are given by his assistants, Jadassohn<sup>3</sup> and Zeissig. These observers used a 10 per cent. suspension of the drug in fluid paraffine, and injected for a dose from  $\frac{1}{3}$  of a grain to one grain into the muscular tissues. They think they have seen in its action results not attainable with any other mercurial salt, without the usual drawbacks of pain, infiltration, and abscesses. Thymolate of mercury, used hypodermically, exerts a rapid and energetic action upon syphilitic manifestations, less pronounced than that of calomel, but greater than that of gray oil. Six or eight injections are sufficient for a cure. Wellander<sup>4</sup> of Stockholm, having tried the remedy in forty-four cases, endorses the encomiums of Jadassohn and Zeissig, though he states that it does not attain the ideal of perfection in syphilitic therapy. He used larger doses of the drug than his predecessors, going as high as a grain and a half, and injecting into the subcutaneous tissues as well as into the muscles. In his experience the local inflammatory phenomena were greater than those observed in Neisser's clinic. Szadek<sup>5</sup> has published his results with thymolate of mercury. This experimenter uses the following formula:

Ry. Hydrarg. thymolo-acetic.,	1.5;
Mucil. acaciæ,	0.5;
Aq. destillat.,	20.—M.

<sup>1</sup> *La Riforma Med.*, 1888.

<sup>2</sup> *Medizin. Obozrenië*, No. 6, 1887; and *Bull. gén. de Thérapeutique*, 1887.

<sup>3</sup> "Einspritzungen von Salicyl- und Thymol-quecksilber zur Syphilis Behandlung," *Vierteljahr. für Derm. und Syphilis*, 1888, pp. 781 et seq.

<sup>4</sup> "Ueber die Behandlung der Syphilis mit Injectionen von Thymol- und Salicyl-quecksilber," *ibid.*, 1889, pp. 453 et seq.

<sup>5</sup> "Zur Behandlung der Syphilis mit intra-musculären Injectionen von Hydrargyrum Thymolo-aceticum," *Wiener med. Wochenschrift*, 1890, No. 22.

Of this liquid the contents of a Pravaz syringe was injected into the thighs every three or four days. The maximum number of injections was eight or ten, and the duration of treatment averaged twenty-seven days. The local reaction was mild, there were no indurations, no nodosities, and never was an abscess produced. These results induced Löwenthal<sup>1</sup> of Senator's clinic to use the drug suspended in glycerin and combined with muriate of cocaine. Improvement was noted after one or more injections; no abscess occurred in the course of two hundred and ninety-three injections. Salivation was only observed in one patient, having bad teeth, and in another nausea and rigors were produced. Löwenthal thinks that the drug has a future as an antisyphilitic remedy.

Cehak<sup>2</sup> also has used thymolate of mercury on a large scale with excellent results. He injected a 5 and a 10 per cent. emulsion in paraffin oil into the buttocks every second or fourth day. No unpleasant sequelæ were observed.

*Benzoate of Mercury.*—This preparation was introduced into medicine by Professor Stukobenkoff,<sup>3</sup> is known as hydrargyrum benzoicum oxydatum, and contains 43 per cent. of mercury. It is slightly soluble in cold water, and readily so in alcohol or a weak solution of chloride of sodium. Stukobenkoff has used it extensively in syphilis, employing a solution containing 4 grains of the mercurial, 2 grains of salt, 1 grain of muriate of cocaine, in 1 ounce of water. Of this mixture a Pravaz syringeful is injected daily into the buttock muscles. It may also be used as a 10 per cent. solution in liquid vaseline. This drug is said to act very rapidly upon early and late secondary lesions. A sensation of slight burning, which lasted two or three days, was observed, as well as mild gingivitis and salivation. It may also be administered in pill form (gr.  $\frac{1}{5}$  to  $\frac{3}{4}$ ), but the recorded results of its action are not striking. Its sponsor also used it in its purity, and in liquid form as an application for chancroids and for gonorrhœa and gonorrhœal cystitis as an injection.

Stukobenkoff's preparation has been used at the Lourcine Hospital in Paris by Balzer and Thierloix, and their results are given in the thesis of Cochery.<sup>4</sup> The formula already given was used by the French observers, who found that it was a very unstable compound, in that in fifteen days two-fifths of the mercury was lost by decomposition and precipitation. The objection which applies to all soluble salts of mercury, that the dose needs daily repetition, is urged against this salt. Its sole advantage, according to these experimenters, is the mildness of the pain following the injections. Their conclusion is terse and to the point: "*En résumé, une nouvelle formule d'injection à ajouter aux autres mais un progrès bien minime s'il existe même.*"

*THE AMIDE GROUP.*—*Formamide of Mercury.*—Formamide of mercury, hydrargyrum formamidatum, was introduced as an antisyph-

<sup>1</sup> "Intramuskuläre Einspritzungen von Hydrargyrum Thymolo-aceticum bei Syphilis," *Deutsche med. Wochenschrift*, 1890, xvi. p. 544.

<sup>2</sup> "Ueber Thymolquecksilber-Injectionen," *Allg. Wien. med. Zeitung*, 1890, No. 7.

<sup>3</sup> "Ein Neues Hg-Salz-Hydrarg. benzoicum oxydatum zur Behandlung der Syphilis," *Wrach*, No. 4, 1889, p. 93; and *Vierteljahr. für Derm. und Syphilis*, 1889, vol. xxi. p. 439.

<sup>4</sup> *Traitement de la Syphilis par les Injections sous-cutanées de Benzoate de Mercure*, Paris, 1890.



ilitic remedy by Liebreich.<sup>1</sup> This observer, impressed with the view that the amides of the body—of which urea may be taken as the principal one—pass out of the system in an undecomposed state, concluded that if combined with mercury decomposition would occur, and that the latter would be reduced and deposited in the tissues. In other words, that this amide would serve as a vehicle for the diffusion of the mercurial. Liebreich is said to have demonstrated this fact before the Medical Society of Berlin. He employed a 1 per cent. solution, and administered one or more Pravaz syringefuls daily into the subcutaneous tissues. The formamide is readily soluble in water, of neutral reaction, and does not coagulate albumin. The action of the drug is rapid and effective. Injected under the skin, it is easily borne, attended with little pain, and not liable to produce salivation. It is said by Liebreich to be much less irritating and painful than the sublimate. Relapses after this treatment are said to be rare, and mild in character. Kopp<sup>2</sup> in Neisser's clinic treated one hundred and twenty-six cases by Liebreich's method, which he submitted to what seems to have been a careful and impartial trial. He used from twenty-five to forty injections into the buttocks in early and late syphilis. He observed salivation and stomatitis in twelve cases (four men, eight women), abscess-formation in one woman, pain of a mild and ephemeral character in thirty-four cases, and in a more lasting and pronounced form in thirty-one cases. Subcutaneous nodules and inflammatory infiltration occurred forty-one times. Kopp concludes from the treatment of mild cases that relapses are frequent, and that it is less energetic than inunctions. The formamide solution keeps better than that of mercurial peptones, but not as well as a solution of the cyanide of mercury. Zeissl<sup>3</sup> the Younger used the formamide in fifteen cases. He found the pain less than that of sublimate, and that no inflammatory reaction was induced. On the arm or forearm he saw in one case a little redness and swelling, which disappeared in two or three days. The lesions in the immediate vicinity of the injected spots did not disappear more rapidly than those more remotely situated. In several cases limited portions of the skin became gangrenous. Stomatitis was also observed. In rebellious cases Zeissl used a greater number of injections, of which twenty was the average for a cure. Róna<sup>4</sup> used the formamide upon fourteen cases, of which only five kept up the treatment to the end, three refusing treatment after the first injection, five after the third, and one after the ninth, on account of the severity of the pain. The therapeutical effect of the drug was highly unsatisfactory, and in one of the five cases mentioned as having kept up the treatment a relapse occurred very promptly. The most recent observer who has experimented with Liebreich's compound is Vyshogrod,<sup>5</sup> who treated with it two hundred and

<sup>1</sup> "Ueber die Behandlung der Syphilis mit Quecksilberformamid," *Wien. med. Presse*, 1883, xxiv. pp. 17-20.

<sup>2</sup> "Ueber die Behandlung der Syphilis mit Subcutanen Injectionen von Hydrargyrum formamidatum (Liebreich)," *Vierteljahr. für Derm. und Syphilis*, 1885, pp. 55 et seq. and pp. 184 et seq.

<sup>3</sup> "Zur Behandlung der Syphilis mit Quecksilberformamid," *Wien. med. Presse*, Nos. 5 and 6, vol. xxiv., 1883.

<sup>4</sup> Syphilis gyógyi-ása formiamidum hydrargyrum (higany-formiamid) oldátaval, *Orvosi hetil*, Budapest, 1883, xxvii. pp. 294-298.

<sup>5</sup> *Proceedings of the Caucasian Medical Society*, May 14, 1889; and *British Journal of Dermatology*, vol. i. pp. 381 et seq.

twelve patients, Russian soldiers. This author speaks of the rapid disappearance of secondary syphilitic lesions, of the rarity of abscess indurations, and of relapses, and of the absence of mouth affections. Added to its activity, its painlessness, and freedom from disagreeable complications, the author thinks the remedy has the further advantage of being cleanly and cheap. In remarks upon Vyshogrod's paper Lünkevitch of Tiflis spoke of the formamide as one of his favorite remedies, and Korona of the same place endorsed it as effective and comparatively painless, and without abscesses when given in the buttocks, but followed by abscesses if given in the back. On the other hand, Gay of Kazan says that the formamide is the most painful of all mercurials, while the bicianide is the least painful. The latter thinks that all mercurials cause the least pain when they are injected into the buttocks, and the most intense when introduced into the scapular and lumbar regions.

Some years ago I used this compound hypodermically in several selected cases, and by reason of its comparative slowness of action and of the severe pains induced I soon abandoned it.

*Glycocoll of Mercury.*—Wolff of Strasburg claims that combinations of (1) glycocoll, (2) of alanin, and (3) of asparagin with mercury are much to be preferred to the formamide of Liebreich, as being more prompt in their action. Given in large doses, these salts produced active salivation and severe effects upon the gastro-intestinal canal. They cause only slight local reaction, and after the injection of 0.01, mercury is found in from six to twenty-four hours in the urine. Wolff thinks that if the reaction at the point of injection is slight, the mercurial preparation acts more quickly, for the reason, he claims, that albuminate of mercury is not formed and absorption of such a deposit not necessary; in other words, that the remedy is taken up without having undergone chemical metamorphosis.

The durability of the three preparations of Wolff varies. Asparagin-mercury is very unstable; alanin-mercury keeps better; and glycocoll-mercury is a stable product. It is prepared as follows:

R. Hydrarg. oxid.,	0.1 gm.;
Glycocoll.,	0.25 “

Dissolve the glycocoll in 5 grammes of water, then add the mercury. When mixed, add water enough to make 10 grammes, and filter. This is the solution for general use. Or it may be made as follows by keeping on hand these solutions: <sup>1</sup>

1. A solution of carbonate of sodium 1.50 to water 100.
2. Sublimate 3.75 in water 100.
3. Glycocoll 2.50 in water 100.

These must be kept in stoppered bottles. A mixture of equal parts of each of these solutions forms the injection fluid. The dose is a Pravaz syringeful, which contains 1 centigramme of oxide of mercury. The needle of the syringe must be of platinum. The injections, according to Wolff, are best made in the back, after the method of Lewin (see

<sup>1</sup> “Ueber die Subcutane Anwendung des Glycocoll-asparagin und Alanin-quecksilbers und deren Wirkung auf den Syphilitische Process,” *Monatshefte für Prak. Dermatol.*, vol. iii., 1884, p. 152.

Sublimate Injections). One injection should be made every day or every second day. Secondary manifestations are promptly effaced by this treatment, but it is evident, from Wolff's remarks, that a sharp lookout must be kept, lest untoward symptoms supervene. Wolff thinks that the prompt elimination of mercury in this form is very advantageous.

*Alaninate of Mercury.*—This preparation, hydrargyrum alanicum, was first brought forward as an antisymphilitic agent by De Luca,<sup>1</sup> who claims that it is exceptionally well tolerated by stomach ingestion and by hypodermic injection. In the latter form, it is, he claims, preferable to all other mercurial preparations, by reason of the smallness of the dose required and the mildness of the local reactions. In infantile syphilis it is to be preferred to other forms of mercury when given by the mouth. In whatever manner given, its effects are gratifying and particularly lasting. It may prove of benefit in cases of late syphilitic manifestations. Selenew,<sup>2</sup> to test De Luca's statement, employed this treatment in twenty-three cases, using a 1 per cent. watery solution, and injecting  $\frac{1}{2}$  of a grain of the salt into the buttocks once daily. The number of injections required varied between twenty-four and fifty-four, and the average sojourn in the hospital was fifty days. Selenew concludes as follows: Alaninate of mercury does not offer any advantages over other soluble preparations of mercury now in use, either as regards the intensity of its general action or its local effects or complications. 2. In the course of its therapeutic use fresh eruptions appear frequently; which fact, therefore, indicates a feeble antisymphilitic power of the drug. 3. In about 40 per cent. of cases the injections give rise to local pain of mild character and to circumscribed infiltration. 4. In about 50 per cent. of cases the remedy induces gingivitis and stomatitis, and in some few a mild and ephemeral diarrhœa. 5. Elimination of mercury in the urine begins on the first day of treatment, and increases between the twentieth and thirtieth injections, and undergoes oscillations during subsequent days; and in this presents nothing unusual. 6. The preparation is very stable, and in a dark bottle will remain unchanged for many days.

*Succinimide of mercury* was discovered by Dessaignes in 1852, and was introduced as an antisymphilitic remedy by Vollert<sup>3</sup> in 1888, under the auspices of Professor Wolff of Strasburg. It is soluble in water, does not become cloudy, and does not precipitate albumin in hydrocele or pleuritic effusions. It causes little infiltration, and never abscesses, if carefully used. Wolff introduces the syringe obliquely, and endeavors in this way to distribute the liquid in the cellular tissue. He further aids diffusion by gentle massage. The dose is about one-tenth of a grain and upward, dissolved in water and injected into the buttocks. The usual advantages are claimed for this agent.

Selenew<sup>4</sup> has also used the succinimide in the form of a 1 per cent.

<sup>1</sup> "L'Alinina Mercurica (alaninato di Mercurio) nella terapia della sifilide," *La Riforma Medica*, March, 1888.

<sup>2</sup> "Das Quecksilberalanilat bei Syphilis," *Meditzin. Obozren.*, No. xvii. pp. 445 et seq.

<sup>3</sup> "Ueber Succinimid-quecksilber ein neues mittel zur Subcutanen Injectionen," *Therapeut. Monatshefte*, Sept., 1888, pp. 401 et seq.

<sup>4</sup> "Zur Syphilis-Behandlung mit Subcutanen Injektionen von Hydrargyrum Succinimidicum," *St. Petersburg med. Wochenschrift*, No. 36, 1890; and *Monatshefte für Prak. Dermat.*, vol. ii., 1890, p. 406.



solution upon thirty-three patients, requiring nine hundred and thirty-three injections. His conclusions are as follows: Syphilitic manifestations disappeared after twenty-four to forty injections. After or during the first five injections roseola and papules often increased in extent and intensity. The initial sclerosis and the ganglia were but little affected. Gingivitis was observed in six cases. Pain and infiltration were almost always absent. Relapses observed during seven months occurred in  $8\frac{1}{2}$  per cent., against yellow oxide 8, alanilate 20, salicylate 37, and gray oil 30 per cent. Mercury is found in the urine within the first few days. It is therefore a mild preparation, suitable for mild cases in women and children. In general its action is not very energetic.

*Urea-Mercury.*—Schütz,<sup>1</sup> in Doutrelepon's clinic, has used a combination of urea with mercury in the treatment of syphilis. He thinks that mercurial preparations formed with the amides are the most efficient, and that urea, the amide of carbonic acid, is preferable to Liebreich's formamide and Wolff's amide. Schütz used the following prescription:

R <sub>x</sub> . Hydrarg. bichlor.,	1.00 gm. ;
Aquæ destillat.,	100.00 ;
Urea,	.22-.50.—M.

Of this solution the dose is a Pravaz syringe-ful once daily.

This preparation is readily absorbed, and is very promptly found in the urine. It is said to cause little local reaction of any kind, and to produce the rapid disappearance of syphilitic lesions. It has the advantage also of being cheap, hence it can be used in charitable practice. The length of treatment was from thirty-three to eighty-seven days, or an average of seven and a half weeks.

*Iodoform.*—This agent was first used subcutaneously in syphilis by Bozzi<sup>2</sup> in a case of severe nocturnal osteocopic pains, together with periodic chills and fever, for all of which quinine in large doses had been given without benefit. Two injections of iodoform, each containing  $1\frac{3}{4}$  grains suspended in glycerin, were given at an interval of nine days. There was marked benefit after the first injection, and two days after the second there was entire subsidence of the pains. Abscesses followed each injection. This treatment was then forgotten for many years.

In 1882, Thomann<sup>3</sup> published a short paper, in which he detailed good results from the injection of iodoform in early syphilis and in cases of the initial sclerosis and of ganglionic enlargement. He began with doses of 0.30 (grs.  $4\frac{1}{2}$ ), and increased them to 0.75 (grs.  $10\frac{3}{4}$ ). The drug was suspended in glycerin and almond oil, the latter combination seeming to cause more cutaneous hyperæmia than the glycerin mixture. The effects were said to be good, the pain on injection slight, and the after-effects very mild.

Neumann<sup>4</sup> also tried this agent hypodermically, and found that while

<sup>1</sup> "Ueber Quecksilberchloridharnstoff: ein neues Antisyphiliticum," *Deutsche med. Wochenschrift*, 1885, pp. 215 et seq.

<sup>2</sup> "Dolori Osteocopici Sifilitici curati colla Iniezione Sottocutanea di Iodoformio," *Giornale Ital. delle Malattie Vener. e della Pelle*, vol. i., 1871, pp. 49 and 50.

<sup>3</sup> "Ueber Subcutane Iodoform Einspritzungen bei Syphilis." *Centralblatt für die Med. Wissensch.*, No. 44, 1881; and *ibid.*, No. 35, 1882.

<sup>4</sup> "Ueber Hypodermatische Behandlung der Syphilis mit Iodoform," *Anzeiger der Gessell. d. Aerzte*, No. 27, Vienna, 1882.

it caused the disappearance of early syphilitic manifestations, its action was very slow, and that inflammatory reaction was produced.

Mracek<sup>1</sup> reported a case of early syphilis in which in thirteen days 6 grammes of iodoform suspended in glycerin were injected. The therapeutic result was not striking. Iodine was promptly found in the urine, and only disappeared therefrom after the lapse of forty days.

In a later communication Thomann<sup>2</sup> concludes that this agent is useful in the second stage in producing resolution of swollen ganglia, particularly when the injections are made in close proximity to them. It is, however, most beneficial in tertiary syphilis, when 0.50 to 1.50 are used at a dose. Thomann says that in his later observations he used as much iodoform in thirteen injections as he had at an earlier date in sixty-five injections, and that he produced no bad results. He concludes—

1. That in tertiary syphilis iodoform exerts a favorable influence upon the healing process.

2. That large doses shorten the length of treatment.

3. That a long time after the discontinuance of the iodoform injections (as long as forty-three days) iodine is found in the urine. It also appears that the remedy has a lasting effect upon the system.

4. That no bad effects are to be observed, such as acne, iodine-catarrh, etc.

It must always be remembered that iodoform, whether applied to wounds of any kind or administered by the stomach or hypodermically, is a very uncertain remedy, and liable, even in moderately small doses, to produce toxic effects of varying gravity. Consequently, if the physician sees fit to give it a trial he should watch its effects very carefully, particularly as to the cerebro-spinal system. In this connection it is interesting to note that Jennings<sup>3</sup> observed purpura in a man who had been taking the drug by the stomach in one-grain doses three times a day for six weeks. Upon its discontinuance the eruption ceased. The mental symptoms produced by the drug are stupor and obtuseness, delirium, and even mania.

*Iodide of Potassium.*—This agent was first used hypodermically by Eulenberg and Thierfelder, but as a method of treatment it has not been largely adopted. In 1882, Besnier<sup>4</sup> reported a case of intolerance of this drug, in which  $7\frac{1}{2}$  grains, taken by the mouth, produced extreme pruriginous disturbance, and in which he injected the same dose into the centre of a gummatous syphilide without producing the same phenomena. He then remarks that this new therapeutical procedure should be made the subject of experiment, in order to determine its practical worth. In a later<sup>5</sup> communication Besnier states that he has further used this treatment, and still thinks well of it.

Gilles de la Tourette<sup>6</sup> in five cases injected  $7\frac{1}{2}$  grains of the iodide

<sup>1</sup> "Ueber Hypodermatische Behandlung der Syphilis mit Iodoform," *Anzeiger der Gessell. d. Aerzte*, No. 27, Vienna, 1882.

<sup>2</sup> "Ueber Behandlung der Tertiären Syphilis Mittels Iodoform Einspritzung," *Centralblatt für die Med. Wissenschaften*, No. 20, 1882.

<sup>3</sup> *Journal of Cutaneous and Genito-urinary Diseases*, 1888, p. 175.

<sup>4</sup> "Un cas d'Eruption bulleuse due à l'Iodure de Potassium," *Annales de Derm. et de Syphil.*, 1882, p. 169.

<sup>5</sup> "Sur les Injections sous-cutanées d'Iodure de Potassium," *Progrès médical.*, Jan. 13, 1883.

<sup>6</sup> "Note sur les Injections sous-cutanées d'Iodure de Potassium, Société de Biologie, Jan. 3, 1883," *Annales de Derm. et de Syph.*, 1883, p. 610.

without any marked local complications. He advises that the solution shall be neutral, that the injections should be made deeply into parts rich in cellular tissue, and that the punctures should be made quite far apart. Slight massage over the site of injections is beneficial in relieving the disagreeable itching produced by the injections. Hypodermically used, the author thinks that cases of iodide idiosyncrasy and intolerance may be overcome. The drug acts very rapidly when used in this manner.

Jackubowitz<sup>1</sup> recommends parenchymatous injections for syphilitic adenitis and inflamed ganglia due to any cause. He uses a solution of iodide of potassium 15 grains, tincture of iodine 5 drops, in 1 ounce of water. By means of a hypodermic needle this is thrown into the substance of the glands. The needle is thrust obliquely into the most prominent part of the swelling, and a fourth part of the contents of the syringe is slowly thrown in. In four such manœuvres the syringe is emptied. Several such operations are often necessary for a cure. The pain is stated to be mild, though slight uneasiness is felt, owing to the distention of the tissues. In those cases, not uncommon, in which the glands are very much swollen, as well as in some cases of subacute adenitis of simple origin, this method may be employed.

In this connection it may be well to mention some late observations by Köbner,<sup>2</sup> though the injections were made into the rectum rather than into the cellular tissue. Köbner presented to the Dermatological Society of Berlin, two years after cure, the case of a woman fifty-six years old who had had syphilitic myositis of the whole left sterno-cleido-mastoid muscle, of eleven years' standing. She had also the same lesion of the lower third of the right sterno-cleido-mastoid, as well as gummy infiltrations into other muscles and into various bones. The iodide, given by the stomach, acted badly, and the woman refused to take it. Inunctions of mercurial ointments and injections of about 12 grains of the iodide into the rectum produced a complete cure in about nine weeks. Köbner thus uses the iodide in all cases of old syphilis in which it produces gastric or general disturbance when given by the stomach. In cases of cerebral syphilis in which there is difficulty of deglutition, and in syphilitic coma, large quantities of the drug may be thus introduced into the system. Professor Rabow in the treatment of mental diseases found Köbner's method of using the iodide and bromide of potassium more satisfactory and rapid than any other. Köbner also claims that he has caused more or less absorption of hypertrophied prostates by means of the rectal injection of the iodide and bromide of potassium combined with belladonna. In order to determine the fact of the absorption of the iodide, Köbner advises that the distal half of the tongue, on its upper or lower surface, or the inside of the cheeks, shall be lightly painted with a solution of nitrate of silver. The solution at once turns yellow if the saliva contains iodine from the formation of iodide of silver.

<sup>1</sup> "Zur methode bei Parenchymatösen Injectionen, eine neue Behandlung der Syphilitischen Bubonen," *Weiner med. Presse*, Nos. 3 and 4, 1875.

<sup>2</sup> "Ueber die Anwendung von Iod- und Brom-präparaten per Rectum zu localen (regionären) und Allgemeinen Heilzwecken," *Therapeutische Monatshefte*, 1889, No. 10.



## THERMAL BATHS; HOT-WATER AND HOT-AIR BATHS; SUBLIMATE LOTIONS AND BATHS, AND ELECTRO-MERCURIAL BATHS.

*The Hot Springs of Arkansas and the Treatment of Syphilis.*—From time out of mind the waters of mineral springs have been regarded by the laity as curative, and even specific, in the treatment of syphilis and skin diseases especially, and in certain visceral and arthritic diseases. There has been, and perhaps always will be, a deep-rooted belief that waters made in the laboratory of Nature possess an occult and potent effect far in advance of any production of the chemistry of man. Among the many and varied mineral and thermal springs of this country, those of the Hot Springs of Arkansas have undoubtedly taken the most prominent rank, and among the laity, and even among the profession, there is a widespread belief in their efficacy in syphilitic affections, skin diseases, and those of a rheumatic nature. For many years I have had exceptional opportunities for studying the effects of the waters of the Hot Springs, and the treatment pursued there upon patients who have been under my care and were temporarily sent there for benefit, upon patients who had been under other physicians prior to their sojourn at the Hot Springs, and upon others whose treatment had been begun there. From this large number of cases I hope to be able to present a fair estimate of the value of these springs as a therapeutic resource in the treatment of syphilis.

An analysis of the water of the most prominent springs in the Arkansas Valley shows that their chief ingredient is silicic acid, and that it, with iron, alumina, lime, magnesia, potash, soda, and traces of iodides and bromides, exists in the proportion of  $8\frac{1}{2}$  grains to the gallon of water. It is very evident that no startling effect can be produced by this natural solution, yet some of the advocates of the Springs speak in quite positive terms of the specificity of the waters, whatever that may mean. Others claim that the beneficial effect of the waters is due to the electricity, produced by chemical decomposition, with which they are said to be charged, while others think that they are imbued with a peculiar heat which is curative. To my mind, the salutary and hygienic effects of these waters (as far as they are productive of good) reside in their heat alone. The stimulation of the capillaries and of the circulation generally, including the lymphatic system, as well as the stimulation of each individual cell of the skin, by the heated water, and the brisk frictions subsequent to the bath, I think act as profound vitalizing agents and are productive of great benefit. But there are many accessory conditions appertaining to a sojourn at these thermal springs which play a very important part in the hygienic reconstruction which is often gained. Having taken the long journey, after much anticipation, preparation, and often at great sacrifice in the matter of time and money, patients arrive at the Springs with an earnestness of purpose and with a fixed resolve that they will make any personal sacrifice, particularly in the matter of creature comforts, in order to be benefited or cured. They for a time undergo personal reformation, and usually sedulously refrain from alcoholics, from tobacco, from the card-table with its late hours, and from sexual indulgence. They, as far as they can, leave behind them all business and social cares; they eat regularly,

go to bed early, and perhaps sleep late, and, in short, conform as far as possible to the most rigid hygienic rules. They have an entire change of scenery and of domestic relations, and, in fact, of the whole routine of life. They breathe a pure air, have abundant opportunity for outdoor exercise, and generally enjoy rest and contentment. Certainly, no one can ask for more auspicious auxiliaries to medical treatment.

It has been claimed that the sedation and tendency to sleep induced by the baths at the Hot Springs are peculiar and due to some occult effect of the waters. It is true that, as a rule, hot baths usually have an opposite effect, but I have many times seen the same soporific result follow hot salt-water baths taken at our seaside resorts. In some instances I have found that excitement and sleeplessness followed baths taken at the Hot Springs.

Let us now consider the conditions in which benefit may accrue to syphilitics who undergo treatment at the Springs. While I am disposed to give this celebrated resort its full meed of praise in the treatment of syphilis, I must here state my emphatic belief that in the majority of cases there is not the slightest necessity of going so far away to attain a cure, and that a very large number of the cases which go there do so because they have not been properly handled at their homes. In other words, the faultiness in the physician's methods of treatment and his shortcomings in the management of his patients are, in many instances, the real reasons why patients have to betake themselves so far away for relief. Furthermore, in very many instances the apathy of the patient, his carelessness and irregularity in following treatment, his absorption in business matters, his often flagrant want of attention to health and hygiene, so thwart his physician's efforts that he perhaps obtains no good, and possibly grows steadily worse.

At no time during the primary stage of syphilis does treatment at the Hot Springs offer any advantage whatever. Treated on the classical lines, the chancre can always be healed, and in the rare event of phagedena we are certainly as well equipped at home as our colleagues at the Springs. In like manner, no peculiar benefit can be derived in the early exanthematic stage. At this time the general health and nutrition of patients are usually good, and they, as a rule, respond readily to the action of mercurials.

All fair-minded men, however, who have much to do with the treatment of syphilis must certainly admit that in certain cases and in certain conditions a sojourn, under proper medical care, at the Arkansas Hot Springs is very often followed by the most gratifying results.

I myself have sent many cases to colleagues at the Springs, and have never had occasion to regret it; and I am glad that as a therapeutic resource we have these springs at our command in cases of urgency and need. While in general we can readily manage the cases of ulcerating syphilides, including the impetigo form, the ecthyma form, the rupial, and the serpiginous, we certainly do find instances which are rebellious and which improve wonderfully at the Springs. In these cases, however, we have usually, as complicating conditions, anæmia, debility, and malassimilation, in which event specific medication is more or less slow or impotent in its working. Many of these cases have run the gamut of mercurial and iodide-of-potassium treatment, and these remedies then act as depressants, rather than as anti-

syphilitics. In such cases the change of scene and air and the baths are of inestimable value.

The matter may be summed up in this way: In many cases where cachexia, due to any cause, and intolerance of the usual specific medication are found to exist and the activity of the syphilis still persists, treatment at thermal springs is indicated.

In many instances of gummata in broken-down subjects the baths are often of great value, and I have seen gummatous infiltration in the throat much benefited by the treatment used at the Hot Springs.

The osseous and articular lesions of syphilis may be only temporarily benefited at the Springs, but late syphilitic rheumatism, rheumatic conditions complicated with visceral disease, combinations of gout and syphilis, late syphilitic cachexia without visible lesions, and the generally broken-down state of old syphilitics addicted to alcoholic and other indulgences, are all frequently much benefited, and some cases thereafter enjoy fairly good health.

When, owing to the usual causes already spoken of, syphilis does not go on auspiciously to its extinction, a sojourn at the Hot Springs is often of decided value for its moral as well as its physical effects. Such patients when at home live in a rut, and, while they perhaps keep at their daily affairs, they are depressed and very often more or less despondent. Change of scene, of air, of habits and customs enlivens them, while previously the treadmill of their existence had made life burdensome.

In persistent and chronic cerebral and spinal affections of the most varied character due to syphilis, and the various morbid states and dyscrasiæ which so commonly complicate it, protracted sojourns at the Hot Springs are often productive of marvellous results. In these cases very often the tolerance of antisyphilitic agents, which are so necessary to relief and cure, is obtained, and patients are often rescued from invalidism and death.

But there are still other considerations offered by the treatment pursued at the Hot Springs. Many cures are there made for the reason that mercury is not withheld from the sufferer, as it had been at home. Many of the Hot Springs physicians are alive to the fact that the methods of treatment pursued by many surgeons in the large cities are faulty. These latter often fail to cure their cases for the reason that they use mercury in too small quantities. They do harm with the drug rather than good. They do not eradicate the disease, but by their timorousness and want of vigorous treatment induce a condition of hydrargyrosis—a mercurial cachexia. I have seen many instances of this complication. At the Springs, after proper preparatory treatment, they receive mercury liberally, and it acts well upon them physically and morally. This fact, to my knowledge, will account for many seemingly surprising cures made at the Hot Springs.

Then, again, there are teachers who inculcate the doctrine that mercury is only beneficial in the early part of syphilis—let us say in its first year. After that it is by them taught that its function is ended and the era of iodide of potassium begins. This fallacious doctrine often works sad havoc on patients, and they hie them to the Springs to regain their health and to get their sovereign panacea, mercury. If this remedy had been administered at the patients' homes, they would not have had the



necessity of knocking at the Hot Springs surgeon's door and of begging for relief.

In like manner, in many instances the administration at the Springs of iodide of potassium in large and increasing doses has cured cases which languished in suffering and disease at home because only small doses were given. But I think the tendency to minimize the dose of the iodide of potassium is not as widespread among the profession as it is in the case of the mercurial preparations.

In the foregoing paragraphs I think I have shown that the successful treatment of syphilis at the Hot Springs is in many instances due to the derelictions and shortcomings of the home physicians, who were imbued with faulty ideas as to the dose of mercury necessary for cure, and often to the method of use.

I think that in a large number of cases (and I have seen scores of instances) patients have resorted to the Hot Springs for treatment of syphilis because their cases were not actively handled, were not thoroughly medicated, or were treated in a free-and-easy, happy-go-lucky manner, or were treated in a too stereotyped, narrow-gauge way at their homes. But here it is well to remember that many cases of syphilis do badly or go wrong in consequence of the apathy and want of care and of the indulgences on the part of the patient.

Furthermore, there is another very important consideration regarding syphilitics at the date of the onset of their malady. Though they may have been deeply impressed with the gravity of their condition, they often become lulled into a feeling of false security after a sojourn at the Springs. I have seen many patients who in later years have suffered severely from syphilis, and who on the breaking out of their disease had hastened to the Hot Springs. They there underwent a course of treatment, and the evidence of their disease vanished. Thinking that besides the skill of man they had, as we may say, supernatural aid from the wells of Nature, many have gone away with a sense of happy security, imagining themselves cured; others have thought that a similar sojourn a few months or a year later was all that was necessary; while others, again, have decided to apply for medical aid only if they should notice later manifestations of their disease. This glamour of security and health conferred by the mystery of the waters has brought many a man to invalidism and death through some late-appearing cerebral or visceral lesion of syphilis.

There is, however, no necessity for taking such a long journey, for other springs will do equally as well. In Virginia, and elsewhere in America, there are hot springs which will act as valuable adjuvants in the treatment of syphilis, and this is the sole action of the Arkansas springs. Take away the mercurial ointment and iodide of potassium from any thermal spring, and its business will soon close up for want of patronage.

During the summer months syphilitic patients can enjoy pure air, beautiful scenery, and repose and quiet at Richfield Springs, where also they may have any form of bath, and may under medical advice partake of natural sulphur waters. There is nothing to be obtained at the Arkansas Hot Springs which cannot be had at Richfield.

The internal use of the waters of the Hot Springs of Arkansas has been claimed to be very beneficial in the treatment of syphilis, and the

idea is fostered in that happy valley that these waters are in a measure specific. Such, however, is not the case. They simply act as diaphoretics and diuretics, and can at any health resort be replaced by a draught of hot milk, hot tea, a little gin and hot water, a little essence of ginger and water, or any other pleasing and innocuous hot drink.

In the section on Mercurial Inunctions the question of the value of sulphur water has been considered. I may here repeat that the experience of physicians at Aix-la-Chapelle and at other springs which give forth sulphur waters goes to show that in certain cases, particularly chronic ones, these waters, in combination with proper mercurial treatment, act very beneficially as diaphoretics and eliminants. My reading and experience teach me that there are no criteria in any case by which it may be stated that sulphur waters are indicated, or that they will probably produce benefit. The only course to pursue is to try them, and be guided by the results observed. It has been claimed that these waters tend to advance the elimination of mercury from the system of those who have been long and injudiciously dosed with that drug. In support of the statement, chemical analyses of the urine in such cases have been made and published to show that mercury has thus been ferreted out and thrown off, but in many of them it is very probable that the synchronous employment of hot sulphur-water baths has had much to do with the eliminative process.

Still further, it is claimed that the internal use of sulphur waters has a direct action in preparing the system to receive mercury and throw off the syphilitic poison. This assertion may be partly true, but we should always remember that change of air and scene, rest, and improvement of the patient's habits and regimen also have much influence in preparing him to receive treatment and in making his tissues less vulnerable to the syphilitic poison.

Liebreich has stated that when mercury acts slowly or ceases to act the original susceptibility of the system to it may be restored by a generous diet and an abundance of salt. I have many times witnessed marked improvement in old cases of syphilis, which had hitched and halted in a mercurial course, from daily hot sea-baths. In these cases, however, a change of air and scene were also essential factors of benefit.

The subject of the influence of hot baths in the treatment of syphilis has of late years attracted much attention, and one of the most valuable papers upon it is by Dr. Vasily K. Borovsky,<sup>1</sup> who investigated the subject at the suggestion of Professor Tarnowski. This observer carried out his clinical observations on 28 syphilitic patients. Heat was employed in the form of (a) ordinary hot-water baths at 98° to 104° Fahr. of thirty minutes' duration; (b) artificial sulphur-baths (prepared by adding 1 pound of sulphur to each bath at from 100° to 104° Fahr. of from twenty to thirty minutes' duration; and (c) hot-air baths at from 180° to 200° Fahr. of from fifteen to thirty minutes' duration. Dr. Borovsky's results may be summarized as follows: 1. Both tepid and hot-water baths, as well as those of sulphur and hot-air, invariably increase the elimination of mercury in the urine. 2. The elimination proceeds more energetically the higher the temperature to which the patient is exposed. 3. The cause of such intensified excretion of mercury should be sought in an increase

<sup>1</sup> "On the Influence of Hot Baths on the Elimination of Mercury in the Urine," *St. Petersburg Inaugural Dissertation*, 1889; and *British Journal of Dermatology*, 1889, vol. ii. p. 22.

of the systemic metabolism, accompanied by the disintegration of mercurial albuminates. 4. A mercurialized patient's organism actually can be completely freed from mercury by means of a systematic employment of heat in one form or another. 5. In such cases, when the elimination of mercury ceases spontaneously, it can be made to reappear by the use of hot baths. 6. Mercurial stomatitis can be cured by heat more quickly than by any other means. 7. Hot-air baths, while inducing an enormous perspiration, promote the elimination of mercury also through the sweat-glands. The total quantity of sweat excreted during a bath amounts to 400 c. cm. and more; that of mercury in the sweat to 1.8 milligrams and more per 400 c. cm. Hence, as a means for freeing the patient's system from mercury they should be preferred to all other baths. 8. The appearance of mercury in the sweat naturally suggests that diaphoretics generally are useful adjuvants in the treatment of mercurialism. 9. Tepid baths (88° Fahr.) should only be resorted to in cases of hydrargyrosis in which higher temperatures are contraindicated on some grounds. 10. Hot-air baths are borne by patients better than hot-water ones (98° Fahr.), which sometimes give rise to fainting. 11. Hot-air baths at 170° or 180° Fahr. of twenty minutes' duration were borne better than those at from 140° to 160° Fahr. of thirty minutes' duration, while the physiological and therapeutical effects of the former are practically identical with those of the latter. 12. In persons having an idiosyncrasy against mercury the employment of heat sometimes affords the possibility of safely continuing mercurial treatment. 13. Hot-air baths, while inducing intense thirst, involve an increased ingestion of fluids, which in its turn leads to an increase in the bodily metabolism. 14. As regards the elimination of mercury from the organism, artificial sulphur-baths do not offer any advantages whatever over other baths. 15. The time required for the complete excretion of the metal from the patient's system varies according to the total amount ingested, individual peculiarities of the patient, temperature of the baths, etc. 16. A simultaneous treatment of syphilis by mercury and heat may sometimes effect a cure more quickly than a mercurial treatment alone. 17. The heat-treatment alone (one or two baths daily for a fortnight), however, usually proves powerless to bring about a cure. 18. In patients with diseased vascular system the use of hot water requires great caution.

The practical deductions to be made from this study are that as an adjuvant to a mercurial or a mixed treatment heat, dry or moist, may be employed in certain conditions and with certain restrictions, with much benefit. Thus it is well to order patients taking mercury to take one or two hot baths each week on going to bed. They undoubtedly increase the potentiality of the drug and benefit the patient by increased elimination and metabolism. They may also take Turkish or Russian baths. Baths of moist heat with mercurial fumes have already been treated of in this article.

The subject of the local treatment of syphilis by heat has been thoroughly prosecuted by Dr. Kalashnikoff<sup>1</sup> of St. Petersburg upon thirty-two hospital patients. In cases of generalized syphilides one of the patient's upper or lower extremities (the most affected one) was placed in a hot

<sup>1</sup> "On the Local Treatment of Syphilis by Heat," *St. Petersburg Inaugural Dissertation*, 1889.



bath, 117° or 118° Fahr., for half an hour twice a day (morning and evening). During the intervals the limb was constantly kept wrapped in a warming compress. In cases of syphilides situated on the hands, buttocks, neck, face, genitals, and such regions of the body generally, where local baths were impracticable, either hot fomentations or an India-rubber bag containing hot water, 115° or 120° Fahr., were applied to the part for an hour twice daily, and in the intervals constant warming compresses were adjusted. Kalashnikoff found that local heat affords a powerful means for promoting the absorption of syphilitic products in the region treated. Primary, secondary, and tertiary lesions subjected to the influence of heat, 117° or 118° Fahr., were made to disappear more quickly than by mercurial treatment. Under a simultaneous treatment by heat and mercury the resolution of syphilides was even more rapidly accomplished. Kalashnikoff found that in cases of relapse such regions as have been treated by heat either remain free from any rash or are affected in a strikingly slighter degree in comparison with other regions of the body. The beneficial effects of heat are attributed to its inducing cutaneous hyperæmia, accelerating the local circulation, raising the temperature of the blood, and modifying the condition of metabolism. According to Kalashnikoff, it is probable that, while promoting the absorption of syphilitic infiltrations, heat at the same time destroys the syphilitic virus itself. Care as to the fitness of the patient to this treatment and to the details of the latter should be exercised.

The efficient and energetic action of local heat in syphilis has been attested by Domashneff, Stepanoff, Fischer, Radestock, and others, and it should be borne in mind as an adjuvant method of reserve. But in its employment watchfulness and care are very necessary. I am fully in accord with Professor Tarnowski,<sup>1</sup> who while admitting that heat applied externally can lead to a rapid absorption of cutaneous syphilides, emphatically objects to regarding their disappearance as being identical with cure of the disease. The truth is, probably, that external lesions are only displaced and driven to other parts of the economy, such as viscera, heart, arteries, brain, etc. Thus it should never be adopted as a method of cure, for it may be injurious or even dangerous. It may, however, in proper cases, be employed moderately and carefully as an adjuvant to general methodical and local treatment.

Sublimate baths are very often of much benefit in extensive rashes of the skin. In cases of papular, scaly, tubercular, or ulcerative syphilides these baths, at a temperature of 100° Fahr., are frequently the means of causing a prompt disappearance of the lesions. From 4 to 8 drachmæ of the sublimate may be used in the bath, to which also may be added double the quantity of chloride of ammonium or common salt. The baths should be taken at night, and the patient should remain in them from fifteen minutes to half an hour, the time being gauged according to the sensations produced by them. When strong sublimate baths are taken rather frequently, it is necessary to diminish or suspend the mercury taken by the mouth.

A watery solution of corrosive sublimate (1 to 3 grains to the ounce) is often of much benefit when applied locally on lint or cotton as a com-

<sup>1</sup> *Arch.*, 1889, No. 5, p. 156, and No. 9, p. 238.

press for dermal lesions, periosteal swellings, onychia, etc. Detmold<sup>1</sup> recommends for external use a watery solution of corrosive sublimate (2 grains to the ounce) which he instructs patients to rub well upon each extremity, using half an ounce at an application night and morning. The results of this treatment were most gratifying, and Detmold resorts to it to the exclusion of all others. The application does not irritate the skin nor produce salivation, though it was thought that griping pains in the stomach were observed after its continued use. This treatment is by no means new, but it has been brought into prominence by Detmold.

Gargles of corrosive sublimate, varying in strength from 2 to 8 grains to 8 ounces of water, are often very beneficial in buccal and pharyngeal ulcerative lesions.

It is well to remember Van Swieten's liquid, since it is useful as a local application in many conditions. Its formula is as follows:

Rx. Hydrargyri chloridi corrosiv.,	gr. ij ;
Alcoholis,	fʒiij ;
Aquæ dest.,	q. s. fʒiv.—M.

One teaspoonful contains  $\frac{1}{16}$  of a grain of corrosive sublimate.

This preparation is particularly adapted for local treatment of secondary and tertiary lesions about the head, face, and neck.

Among the curiosities of syphilitic therapeutics may be mentioned the electric-sublimate baths exploited by Ehrmann and Gaertner.<sup>2</sup> These baths contain three drachms of sublimate, which salt, it is thought, enters the system by means of an electric current of an intensity of 200 milliampères. The baths are given every day or every second day, and should be of half an hour's duration, though the current is only to be kept on for fifteen minutes. The authors of this method of treatment claim—1st, that the introduction of mercury takes place in the same way as when inunctions are used, and that the stomach and liver are spared; 2d, that absorption takes place by almost the whole surface of the skin, upon which the mercurial also exerts a local action; 3d, that the quantity of mercury absorbed is proportionate to the intensity and duration of the current, and that exactitude of dose is thus made possible; 4th, that it is painless and without danger. Under this treatment the urine shows the presence of mercury after sixteen to thirty baths; hence absorption is not rapid. After a time it was found that the system did not take up any more mercury. Toxic effects, such as diarrhoea, salivation, and scaling eczema, were noted in a few cases.

Another method of treatment of syphilis has been proposed by Brémont<sup>3</sup> which is claimed to be successful when other methods fail. The patient is placed in a box with his head out, and a sprayer projects

<sup>1</sup> "Diagnosis and Treatment of Syphilis," *Med. News*, March 8, 1884.

<sup>2</sup> "Le Bain électrique au Sublimé, expérience sur un nouveau Traitement mercuriel," *La Semaine médicale*, 1889, p. 438; and "Du Traitement de la Syphilis par les Bains électriques au Sublimé," *ibid.*, 1890, p. 357.

<sup>3</sup> "Traitement de la Syphilis par l'Absorption cutanée des Médicaments," *La Semaine médicale*, 1889, p. 284; and "Traitement de la Syphilis aux Diverses périodes de la Maladie, par l'Absorption des Médicaments par la Peau," *Journal des Mal. cutan. et Syph.*, vol. i., 1890, p. 297.

at him, all over his body, numerous jets of steam containing particles of sublimate or iodide of potassium.

**Treatment of the Syphilides.**—ERYTHEMATOUS SYPHILIDE.—As a rule, internal medication causes this syphilide to disappear promptly, but it is always well to hasten its involution by sublimate baths, mercurial vapor baths, or by inunction. Upon the face, neck, hands, and wrists this syphilide may be persistent, and its disappearance may be hastened by using the following ointments:

R̄. Hydrargyri ammonati <i>vel</i> hydrargyri	
oxidi rubri,	gr. xx ;
Unguent. aquæ rosæ,	3j.—M.

R̄. Hydrargyri subsulph. flav.,	3ss ;
Vasellini,	3j.—M.

The latter is much thought of by Mauriac. In some cases of persistent eruption about the face the following lotion may be used:

R̄. Hydrargyri chloridi corros.,	gr. iv ;
Aquæ coloniensis,	3ij ;
Aquæ,	ad 3iv.—M.

Apply three or four times a day.

The erythematous syphilide is not uncommonly complicated by a seborrhœic process, as shown by the development of orange-red patches of scaly skin upon those parts of the forehead, glabella, alæ nasi, and around the mouth, on which the sebaceous and sudoriferous glands are most abundant. This condition is also found on the scalp and upon the sternal region. For these cases resorcin in liquid or ointment form is very efficient. The following ointment may be used, after well washing the parts with the simple tincture of green soap (*tinctura saponis viridis*):

R̄. Resorcin.,	3ss–3j ;
Acidi carbolici,	gtt. xx ;
Unguent. aquæ rosæ,	3j.—M.

**THE PAPULAR SYPHILIDES.**—These eruptions are usually amenable to internal medication if they are attacked early. But even if internal treatment is ordered, one or other of the external methods should be used occasionally, in order to expedite their involution. The small and large miliary papular syphilides are the ones which are most resistant to remedies general and local. They, like all stubborn papular syphilides, should be treated by hot baths, either alkaline or sulphur, and by frictions of mercurial ointment. Massage has recently been recommended by Balzer<sup>1</sup> as an adjunct in the treatment of these syphilides. Mercurial ointment is to be rubbed into the surfaces firmly and deeply, each seance occupying from twenty minutes to half an hour. I have used this

<sup>1</sup> "Contribution à l'Étude du Traitement local des Syphilides; Utilité de Massage," *La France médicale*, Jan. 9, 1891, pp. 18 et seq.



method of treatment for many years, and have long since become convinced of its efficacy and necessity in many cases. In some cases of extensive pigmentation following syphilitic eruptions baths and massage treatment have been followed by striking results. Scaling eruptions of the palms and soles, the sequelæ of the erythematous and papular syphilides, are peculiarly obstinate and prone to relapse. They may be benefited by local sublimate baths, as recommended by Sigmund, and, more recently, by Gilles de Latourette.<sup>1</sup> Hot alkaline baths with the addition of bran are also very efficient. After immersion of the parts they should be enveloped in a mild form of mercurial ointment, as follows:

R̄. Unguent. hydrargyri nitratis,	ʒij ;
Olei rusci,	ʒj ;
Unguenti,	ʒj.—M.

R̄. Unguent. hydrargyri nitratis,	ʒij ;
Olei cadini,	ʒj ;
Vaselini,	ʒj.—M.

R̄. Hydrargyri ammoniati <i>vel</i> hydrargyri	
oxidi rubri,	gr. x-xxx ;
Olei rusci,	ʒj ;
Vaselini,	ʒj.—M.

Such is the inflammatory condition present in some cases that a soothing ointment is required, as follows:

R̄. Unguent. diachyli (fresh),	ʒij ;
Unguent. hydrarg. nitratis,	ʒj ;
Olei rusci,	ʒss.—M.

In some cases of localized eruption a mild solution (from 1 to 4 grains to the ounce, of bichloride of mercury in flexible collodion or traumaticin may prove very efficient. Sometimes, when the tendency to scaling is very great and persistent, chrysarobin may produce happy results.

PUSTULAR, ENCRUSTED, AND SERPIGINOUS SYPHILIDES.—The early and intermediate pustular syphilides require sublimate, mercurial vapor, and sulphur and alkaline baths. Then the patient's body should be rubbed with mercurial ointment or a strong white precipitate ointment. About the face it is imperative that these lesions should be efficiently acted upon, in order to cause their prompt disappearance and to prevent cicatrices. For this purpose the following ointments may be used:

R̄. Zinci oxidi,	
Pulv. amyli,	āā. ʒij ;
Unguent. hydrargyri (freshly prepared),	
Vaselini,	āā. ʒss.—M.

<sup>1</sup> *Progrès médical*, June 10, 1886.

R <sub>y</sub> . Hydrargyri ammoniati,	gr. xxx;
Zinci oxidi,	
Pulv. amyli,	āā. ʒij;
Vaselini,	ʒss.—M.

Resorcin, 1 drachm, may be substituted for the white precipitate in cases in which there is a seborrhœic complication.

The encrusted syphilides require the use of baths and fomentations for the removal of crusts, and then calomel or iodoform may be dusted upon the raw surfaces, which should be covered with absorbent gauze. When these surfaces are extensive iodoform should be used sparingly, lest it produce a toxic effect, or it may be mixed with an equal quantity of sub-nitrate of bismuth and then applied more freely.

The serpiginous syphilide is sometimes very obstinate in its course, ordinary treatment failing to prevent its extension. Under these circumstances free but careful curetting, after removal of crusts and disinfection, as found beneficial by Spillmann<sup>1</sup> in five cases, may prove remarkably efficient. I have seen one such application promptly cause the healing of a case which had been rebellious for many months. A similar procedure may be beneficial in some cases of extensive rupia after the removal of the crusts and the laying bare of a well-marked fungating surface. Some raw surfaces left by ulcerating syphilides show a tendency to exuberant fungating growths. When not sufficiently well marked to require curetting, they may be carefully touched with carbolic or nitric acid, after the manner laid down for the treatment of chancre.

**GUMMATOUS SYPHILIDES.**—The early or precocious gummata indicate the necessity for the use of the mixed treatment, or of iodide of potassium in combination with mercury applied locally. Daily inunctions should be made, and mercurial ointment spread on lint should be bound upon the parts. If much pain is present belladonna ointment may be mixed with the mercurial ointment.

In their non-ulcerated state late gummata may be treated in the manner just now described. When ulceration is active it may be necessary in some cases to scrape away the base and the margin. The necrotic membrane which is so commonly seen in these ulcers should be treated with compresses of sublimate solution (1 to 500, 1000, or 2000), or with compresses of carbolic-acid water (5 per cent.). The application of carbolic acid or nitric acid may be necessary. When the slough or membrane on the surface of the sore is not very dense or adherent, iodoform may be dusted upon it. When a raw surface has been exposed the application of a mild mercurial ointment with the addition of some balsam of Peru (1 drachm to the ounce) will usually cause prompt healing. In very large and deep gummatous ulcers, after dusting with iodoform, sterilized sand may be freely packed in and retained by absorbent gauze and bandage.

**TUBERCULAR SYPHILIDES.**—These when of the non-ulcerative variety, should be treated in the manner indicated for papular syphilides. Being late and deep lesions, they require the administration of both mercury and iodide of potassium. To cause their involution mercurial baths and sublimate baths may be employed. Each tubercle should receive very

<sup>1</sup> *Progrès médical*, Sept. 5, 1885.

vigorous friction with mercurial ointment, which when practicable should be kept in constant contact with the lesion. In some cases mercurial plasters may be very efficacious. Scaling conditions of the skin left by this syphilide require a similar treatment to that of the scaling sequelæ of the papular syphilides.

**Treatment of Affections of the Nervous System.**—The early supervention of symptoms referable to the cerebro-spinal system in many instances necessitates the precocious use of the iodide of potassium. Syphilitic headaches will frequently be found to be very persistent and rebellious to treatment when mercury is given by the mouth. I have seen in consultation many such instances, where the use of pills has been pushed to the extreme of intense salivation, and yet the nocturnal headaches persisted. In some few cases calomel, in doses of  $\frac{1}{5}$  or  $\frac{1}{4}$  grain every three or four hours, may prove beneficial, but the danger of salivation is always to be feared if its use is at all prolonged. Mercurial inunctions into the neck and temples will usually prove very beneficial, and synchronously iodide of potassium in increasing doses should be given.

Any affection of the cerebro-spinal system occurring in the early years of syphilis should be treated by mercury, either administered by inunctions, made as near the head as possible, or by hypodermic injections, two or three of which may be given in the neck. At the same time iodide of potassium should be given internally. This remedy may be taken in milk, in Vichy water, and in cases of weak stomach may be combined with Fairchild's essence of pepsin, and also with bitter tonics. In some cases a dose of 30 grains three or four times a day will have the desired effect. In obstinate cases, however, the remedy must be pushed with a free hand until amelioration in the condition is produced or the obstinacy of the case shows that such disorganization has been produced by the syphilitic process that further improvement is hopeless. As much as 1 ounce or  $1\frac{1}{2}$  ounces have been required in many cases to produce a cure. I am, however, firmly of the conviction that when mercury is synchronously administered, as it certainly should be even in advanced cases, it will seldom be necessary to push the iodide as heroically as has been done in the past.

Besides the essential treatment here succinctly outlined, much treatment directed to concomitant and consecutive symptoms and conditions will be required, and should be instituted according to the indications presented.

**Treatment of Gingivitis, Stomatitis, and Salivation.**—A patient under mercurial treatment should be, as before stated, carefully watched as to the condition of his mouth, throat, and nose. When there is any tendency to hyperæmia of the mouth and throat, free gargling three or four times a day with solutions of chlorate of potassium and alum, of common salt, or of borax should be used. When patients are undergoing an inunction cure, particularly, it is well to wash the mouth three or four times a day with strong alum-water or with a solution of alum and acetate of lead, as follows:

R. Pulv. aluminis,	3ij ;
Plumbi acetatis,	3ss ;
Aquæ,	3viiss.—M.



The first signs of irritation of the gums should cause a diminution of the dose or a suspension of treatment and the adoption of local therapeutics. In any and all cases of mercurial action upon the mouth the physician should be very conservative in the use of caustic applications. For mild cases of gingivitis the application by a brush of equal parts of tincture of myrrh and tincture of iodine once a day, followed by some mild mouth-wash, will usually be all-sufficient. When the case is severe, and the tissues of the mouth and throat are very much inflamed and swollen, frequent rinsings with very warm solutions of borax and alum to which listerine and glycerin are added are very soothing. Once or twice a day it may be necessary to use as a mouth-wash and gargle a solution of the nitrate of silver (4 to 8 grains to the ounce). Much benefit often follows rinsing the mouth with a solution of bichloride of mercury. For this purpose Von Swieten's solution, either in its purity or diluted, will prove very efficacious. It is thought by Galippe, Renzie, and others that much of the intensity of the mouth-inflammation in mercurial poisoning is due to the activity of microbes, which are so numerous in the mouth, and that by its antiseptic action the bichloride is very efficient in these conditions. Patients thus suffering should be well nourished by means of nutritious broths and sarco-peptones, and should take quinine freely. They should be kept in the fresh air as much as possible. Much benefit and comfort may be derived from the application of a solution of cocaine to ulcerated surfaces. The judicious use of hot baths will aid in the elimination of the mercury from the system.

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## CHAPTER LXXXVI.

### HEREDITARY SYPHILIS.

THE words "congenital" and "infantile" are used to designate this variety of syphilis; the former lacks precision, and the latter may be applied with equal propriety to the hereditary and the acquired forms. The term *hereditary syphilis*, therefore, seems preferable. According to Kassowitz,<sup>1</sup> one-third of all children procreated of syphilitic parents are dead born, and of those born living 24 per cent. die within the first six months of life. In his personal experience Fournier<sup>2</sup> found that in private practice more than 2 out of 3 hereditarily syphilitic children died, either before, at, or soon after birth. In hospital practice Fournier found that out of 167 children born of syphilitic mothers, 145 died; which means that 1 child out of 7 or 8 survived. It having been claimed that Fournier's personal statistics made an exceptionally bad showing, and that they were exaggerated, he collected those from the whole world, his

<sup>1</sup> *Die Vererbung der Syphilis*, Vienna, 1876.

<sup>2</sup> *La Syphilis héréditaire tardive*, Paris, 1886, pp. 160 et seq.

own excepted. He gathered the histories of 447 cases of children whose fathers or mothers were syphilitic, and found that out of this number there were 343 deaths, there being only 104 who survived. Of the 343 children who died, only 6 lived beyond the first year. The proportion of living children, according to these statistics, is 1 to 4.3. We may understand why the lesions of hereditary syphilis are so severe and extensive, and why its fatality is so great, when we consider how early in foetal life the specific virus exerts its influence, and how thoroughly it must be diffused through the organism of the embryo.

In the majority of cases of hereditary syphilis symptoms appear about the third week of life. Some authors have observed a postponement of symptoms until the end of the first year or even later, but in my experience the twelfth week has been the utmost limit.

In case of the infection of both parents the disease is likely to be transmitted in an intense form, resulting in the death of the foetus or in the early manifestation of symptoms.

There are few exceptions to the rule that the severity of the disease decreases with each succeeding child. The danger of the death of an infected child diminishes as it grows older, and freedom from symptoms until after the sixth month justifies a favorable prognosis. Death results most frequently in cachectic children and from gastro-intestinal affections, which are to a great extent dependent on visceral lesions.

Syphilis is generally transmitted only to the second generation; exceptionally, in case of excessive activity of the disease in the first inheritor, it may perhaps appear even in the third generation.<sup>1</sup> The course of hereditary syphilis differs in many respects from that of the acquired disease. The latter always begins, as we have seen, by the development of a local lesion, which is followed by a definite secondary period of incubation, at the expiration of which constitutional manifestations appear, while the hereditary disease presents no initial lesion and cannot be divided into stages. Moreover, while many of the lesions of each are similar, being undoubtedly caused by the syphilitic poison, on the other hand, a large number of those in the hereditary form are merely the result of perverted nutrition, and may occur in any adynamic disease. Among such lesions may be classed certain affections of the eyes, peculiar osseous malformations, hydrocephalus, impaired growth of the hair, as well as deafness and deaf-mutism, the ultimate cause of which is unknown.

The lesions of hereditary syphilis are more hyperæmic and active than those of the acquired form, and tend to involve larger surfaces. As a rule, the early lesions are more generally distributed and are more symmetrical than those which are developed later.

Vesicular and bullous syphilides, so rare in acquired syphilis, are quite common in hereditary, while rupia is almost unknown in the latter. Affections of the nasal mucous membrane, which are infrequent and appear late in the former, are among the earliest and most reliable diagnostic symptoms of the hereditary disease. Visceral affections are much more common in the latter than in the former, frequently being multiple, and coexisting with lesions similar to those of the secondary stage of the

<sup>1</sup> *Vide infra.*

acquired disease. Gummatous and connective-tissue infiltrations are often developed before birth, and are more diffuse and symmetrical when they appear before the end of the first year of life; when seen after that period they may present the characteristics of the acquired forms. A peculiar and constant lesion of the ossifying ends of the long bones has been observed during the early months of hereditary syphilis. Certain bone-lesions may be developed at a later period which resemble those of the acquired disease. Affections of the nervous system, although more common than has been supposed, are comparatively rare in hereditary syphilis.

Evidences of hereditary taint usually disappear before puberty, although syphilitic lesions undoubtedly hereditary have been observed at later periods, and in some instances after years of apparent latency. The extent to which inherited syphilis furnishes immunity to the acquired form is still undetermined.

The opinion, which has been sustained chiefly by Ricord, Maisonneuve, and Montanier, that syphilis, especially in its tertiary form, may be transmitted to offspring as scrofula, phthisis, or rickets, is utterly untenable.

Syphilis is always transmitted as syphilis, although the cachexia induced by it undoubtedly predisposes the infant to affections of this kind, just as any adynamic disease may do. The prevalence of this tendency, which is quite rare in America, seems to be very marked in Germany, where Kassowitz and Alois Monti found that nearly every syphilitic child became rachitic.

In hereditary syphilis as in the acquired disease the same tendency exists to the development of tuberculosis, and this dangerous symbiosis is always to be feared in infected children, old and young.

**The Duration and Progress of Hereditary Syphilis.**—The duration of hereditary syphilis depends altogether upon two conditions—the intensity of the diathesis and the treatment. It is not uncommon for children to present mild and superficial symptoms for a few months or a year, and then become blooming and healthy, never again to be affected with syphilitic lesions. Again, severe and extensive lesions may be exhibited during the early months, which relapse at irregular intervals in an equally intense but more limited form for a few years; or syphilitic lesions may be developed from time to time until the tenth or twelfth year, perfect health being established after that time. In very chronic cases symptoms may recur more or less frequently until puberty. My observations lead me to the conclusion that they do not appear after that date. In general, the severity of hereditary syphilis is expended within the first few years, and subsequent lesions, although possibly extensive and deep, do not show the malignancy of early ones.

The **course** of hereditary syphilis is equally chronic as that of the acquired disease, and is even more irregular and uncertain. For this reason the lesions cannot be arranged in chronological order, and a precise division of the disease into stages is likewise impracticable. Visceral and superficial lesions frequently coexist; the interval between early and late lesions may be but a few months or even many years.

As in the acquired form, so in hereditary syphilis, the extensive superficial exanthems are peculiar to the first months of the disease. With



these may coexist lesions of the mucous membranes, of the bones, or of the viscera. Relapsing syphilides are usually less extensive than the first eruption, and their lesions are less numerous. They may be composed of either papules, pustules, or vesicles, the eruption being polymorphous or made up of one variety of lesion. The course of these relapsing syphilides may be even more chronic than that of the first eruption, and the interval between the two may be a few weeks or several months. Sometimes the second rash appears before the complete disappearance of the first. It may be said that these relapses of general eruptions are, as a rule, peculiar to the first two or three years of the disease. Subsequent eruptions are of another order, more profound, more localized, and less likely to relapse. These later orders of dermal lesions may be papulo-tubercular or perhaps pustular, but in general they are tubercular, tuberculo-ulcerous, and gummatous.

These cases of late development are rather rare, although I have seen fully six dozen in which such lesions have appeared at the third, sixth, eighth, twelfth, fifteenth, and twentieth years. In fully one-half they occurred between the fourth and twelfth years, in three-eighths between the third and fifth, and in the remainder between the twelfth and twentieth years. It is very rare to see dermal lesions extensive and superficial after the second or third year, they being usually profound and limited, and in this respect differing from those of the acquired disease. Under the heading of syphilis hereditaria tarda many interesting cases of dermal, osseous, visceral, and cerebro-spinal lesions, have been reported during the last decade. In many cases, however, the history of syphilis is very vague.

In the majority of cases the development of visceral lesions takes place in intra-uterine life, and their course after birth is retrogressive. The principal organs attacked are the liver, the lungs, the brain, and the kidneys. Our knowledge of the frequency and extent of their development after birth is incomplete. Besides the cutaneous and visceral lesions of the first year or two, other syphilitic affections are frequently observed. In many cases the diaphyso-epiphyseal lesions of the bones appear during intra-uterine life and run their course in the early months of the disease, possibly relapsing at a later period; or they may appear for the first time during the first year of life. From the fourth up to the twentieth year the shafts of the bones may be affected by periostitis, and joint affections often occur.

The lesions of the mucous membrane are, like those of the skin, superficial and often extensive in the first years of life; at later periods they are circumscribed, profound, and destructive. Occasionally iritis, choroiditis, or retinitis occurs, generally between the third and sixth years, while we observe that keratitis may appear at any time up to the fifteenth or even twentieth year.

In the somewhat rare cases of hereditary syphilis presenting cerebral and nervous symptoms, it has been noted that such symptoms and nutritional affections of the cranium, teeth, etc., begin in the early years of life and leave more or less marked traces.

The severity of hereditary syphilis exhausts itself within the first three years of life; whatever symptoms are manifested after that time are developed in the most chronic and irregular manner. Therefore, if any division of the disease into stages were to be made, the first four

years might be considered the first stage, or the period of the disease proper, the second stage extending from that time indefinitely, but not beyond the twentieth year.

**The Process of Procreation.**—The study of hereditary syphilis is much simplified by a clear understanding of the process of procreation, which is described by Haeckel<sup>1</sup> as follows: "The nature of fructification rests essentially upon the truth that the male procreative cell becomes intimately blended with the female amœba-like ovule. By this means, in the first place, the ovule is incited to further development, and, secondly, the transmission to the child of the hereditary qualities of both parents is effected. The male procreative cell entails upon the child the individual character of the father, and the female ovum transmits hereditarily to the new being the characteristics of the mother."

The embryo resulting from the union of these two germinating cells is nourished and matured in the womb of the mother through the uteroplacental circulation. The influence of the father upon the foetus is limited to the supply of organic cells at the time of fecundation; that of the mother continues in a modified form through the period of gestation. Since numerous facts support the idea of the transmission to offspring of mental and physical qualities, we are warranted in assuming that diseases, among them syphilis, may be likewise inherited, the sperm-cells of the male and the ovule of the female being the conveying media. Hereditary syphilis may therefore be derived from one or both parents, since it originates in the procreative cells of either male or female.

*Influence of the Father.*—So many undoubted instances of the transmission of syphilis from father to child have been reported that further evidence is scarcely needed. The risk of contagion from the father is great in proportion to the activity of his symptoms. If procreation takes place while he is in the first period of incubation, the child will escape, and may do so even during the secondary period of incubation, but infection is more probable as the latter stage advances. Probably, his malign influence begins with the evolution of constitutional manifestations.

There is abundant evidence that if the disease is not treated the sperm-cells will retain the syphilitic virus through the first year, since temporary and spontaneous latency of the disease is observed only at a later period. On the other hand, mercurial treatment may so modify the disease that the child will escape even within the first year. We see frequent examples of this when men recently syphilitic and compelled to marry are put under an active mercurial course, and within a year become fathers of children who never show the slightest evidence of syphilis. Rare instances occur in which the disease, although unmodified by treatment, infects the system of the father so slightly that the foetus escapes even during the first year.

Mercurial treatment, however, is the most potent means at our command of finally eradicating the disease. Without it, the danger of transmitting the disease to offspring usually persists up to the fourth year of syphilitic infection. By faithful pursuance of a mercurial course the probability of the procreation of healthy children is increased from year to year.

<sup>1</sup> *Anthropologie oder Entwicklungsgeschichte des Menschen*, Leipzig, 1875, p. 138, quoted by Kassowitz.

The effect of mercury is not always permanent, especially if it is employed in only a single brief course during the first year. The sperm-cells of the father having as a result of treatment ceased to procreate syphilitic children, the disease may, on the cessation of treatment, again become active, and the next child or children may in consequence be syphilitic. This fact has been conclusively proved by a number of cases reported by Kassowitz,<sup>1</sup> and also in two cases under my own observation,<sup>2</sup> in both of which the father was syphilitic and the mother healthy. Seven children were born, of whom the first five were syphilitic, the sixth perfectly healthy, and the seventh markedly diseased. In this case the mother was healthy, and the disease of the father was uninfluenced by treatment until after the birth of the fifth child, when he was under active treatment, which was abandoned after the birth of the sixth.

Our chief points of guidance in estimating the probable influence of a syphilitic father upon his offspring are the degree to which the disease has affected his system and its amenability to treatment. It is well to add that the earlier a mercurial course is begun, the greater will be its effect upon the disease and the more complete the future immunity of the patient. When the symptoms are trifling we should not assume that the sperm-cells are healthy; on the contrary, we should insist upon an active and prolonged course of treatment.

Those rare cases in which distinct evidences of syphilis are shown, such as gummata, nodes, palmar psoriasis, etc., without any indication of transmission of disease to offspring, have merely the local relics of an exhausted syphilis.

This paternal transmission is called germinative or spermatie infection, and if syphilis is really a disease due to a bacterium, we, guided by analogical evidence, can readily understand the nature of the process. As pointed out by Von Düring,<sup>3</sup> Pasteur's discovery that "the germs of the disease of silk-worms, called pebrin, pass into the ovulum and into the spermatie cells of the infected worm, which retains its power of fecundation and germination, and transmits the infection to its offspring, throws a flood of light upon the pathology of the transmission of syphilis by heredity. When to this evidence we add the results of the experiments of Maffuci and Baumgarten, who succeeded in infecting eggs with tuberculosis and in detecting that disease in the resulting chicken, it almost seems that the question is settled."

Although the paternal influence in transmission is now generally acknowledged, there are authorities who still claim that the disease is derived exclusively from the mother. This theory, now known as that of Cullerier, who was one of its prominent advocates, is based upon observations which were rendered imperfect by failure to appreciate the facts that syphilis may be influenced by treatment and that the disease has periods of true latency.

In support of this view Cullerier cites the cases of two men who, in the early stages of syphilis, underwent treatment, one even to salivation,

<sup>1</sup> *Op. cit.*, and "Ueber Vererbung und Uebertragung der Syphilis," *Archiv für Derm. und Syph.*, 1884, pp. 198 et seq.

<sup>2</sup> "A Contribution to the Study of the Transmission of Syphilis," *Arch. Clin. Surg.*, N. Y., Sept., 1877.

<sup>3</sup> *Monatshefte für Prak. Dermat.*, vol. xx., No. 5, 1895.



and of many healthy women who bore within a year of marriage perfectly healthy children. In the light of our previous studies the explanation is very simple. Moreover, Cullerier's articles show that he has seen syphilitic mothers produce diseased children, and has failed to learn the condition of the father, whose influence on the offspring is almost as powerful as that of the mother, and he has, therefore, reached a dangerous and false conclusion. It is useless to consider in detail the arguments and cases of those who follow in the same line, chief of whom are Follin, Notta, Charrier, and Oewre. I would advise a perusal of the criticism upon this theory, and upon the cases offered by its advocates, in the admirable works of Kassowitz.

I think we are fully warranted in adopting the conclusion that *the father may transmit syphilis to his offspring*.

*The Influence of the Mother.*—In order that syphilis may be conveyed by the mother her disease must be constitutional. It is very probable that the ovule of the female is infected in the same way as are the spermatozoa of the male.

When impregnation occurs later than within two weeks of the evolution of general manifestations, the foetus is almost inevitably affected, and the activity of the disease in the child will be in proportion to that of its early stage in the mother, unless the disease has already been modified by active mercurial treatment.

Statistics show that such embryos rarely reach maturity, abortion occurring usually from the fifth to the seventh month, sometimes as early as the third.

In such cases, in addition to the disease of the ovule itself the nutrition and growth of the foetus, which depend upon the richness and purity of the mother's blood, are impaired in proportion to the severity of the disease in the mother, although her specific syphilitic influence ceases after conception.

The claim, which my own experience tends to confirm, is made by Fournier and others that syphilis affects women more profoundly than men, and that it induces in them, more frequently and more severely, a condition of chloro-anæmia. Women in this condition becoming pregnant are, doubtless, very likely to abort, while, on the contrary, an embryo profoundly syphilitic may reach maturity. Under these circumstances treatment probably does not cure the disease of the foetus, but may act upon it indirectly by improving the condition of the mother.

In many women, however, as in some men, the course of syphilis is very mild, and during the whole secondary period an appearance of perfect health is retained.

The blood of such women is, of course, not profoundly altered, hence the nutrition of the child is relatively good. This point will be more fully considered.

Since arbitrary rules regarding the parental influence in the transmission of syphilis cannot be laid down, I shall give merely the general results reached in the experience of reliable observers, supplemented by my own.

The frequent observation that the product of conception, occurring while either parent is in the early and active stage of the disease, is intensely syphilitic or fails to reach maturity, and that healthier children

are produced as the disease of the parent becomes less severe, is ground for the assertion that the severity of the syphilis in offspring is in proportion to its activity in either or each parent at the time of conception. Thus, if a syphilitic woman becomes pregnant, or if the disease is derived from a man in whom it is active, the first foetus may live only to the third month. Without treatment the next pregnancy may have a similar result, gestation possibly being a little longer. As the disease becomes modified by time or treatment a living but syphilitic child may be born; in succeeding pregnancies the traces of the disease fade, until finally healthy children may be produced.

The power of hereditary transmission peculiar to the mother depends, as in the case of the father, upon the state of the syphilis in her organism, similar periods of latency, both spontaneous and due to mercurials, being met with in the female. If her system at the time of conception is temporarily free from syphilitic influence, her ovules are capable of producing healthy children.

The number of syphilitic children which a woman may produce varies. In some cases of a mild character healthy children may follow the birth of one or two infected ones. In other cases, particularly in those partially or entirely untreated, there may be six or more.

As a rule, after the lapse of six years the influence of the disease has become so feeble that the risk of transmission is extremely slight.

Mercurial treatment seems to have quite as marked an effect in eradicating the disease and in diminishing its transmissibility with women as with men.

We have seen in the case of the father that the disease may be temporarily so modified by treatment that healthy children will alternate with those diseased. The same is true of the mother.

The rare occurrence of a syphilitic woman giving birth to twins, one diseased and the other healthy, seems difficult of explanation, but is doubtless due to the infection of one ovule alone. Much light is thrown upon this apparent anomaly by the fact that certain syphilitic cells or molecules may be temporarily confined to parenchymatous organs, while the system at large remains exempt.

We come now to an interesting question: *Can syphilis be conveyed through the utero-placental circulation?*

This mode of transmission is now pretty generally admitted, but many discrepancies are found in the statements of its advocates. It is claimed by some that the transmission of syphilis to the child depends upon the occurrence of the mother's infection during the first half of pregnancy, while others regard the latter half as the dangerous period. It seems singular that this theory has been accepted at all, in view of the prevalence of so much uncertainty and lack of precision.

The question, however, is a very simple one—namely, Can the syphilitic infection of the mother be conveyed through her blood to the child?

The experiments of Pellizzari have conclusively proved that the blood cells are the active agents of syphilitic infection. After fecundation the embryo is not supplied with cells of any kind, but simply with serum. There is, therefore, after the occurrence of conception no possibility of the transmission of syphilis, provided the structure of the placenta is not impaired.

The literature of the subject furnishes not a single reliable case in proof of the theory. Many cases, apparently convincing, are reported which on careful scrutiny show some vital defect. The following is an illustration of this point: A pregnant woman, healthy at conception, becomes syphilitic during gestation, and brings forth a premature macerated child, or a syphilitic child may be born at full time. Of such cases certain authors say that the former was a syphilitic embryo, and that the latter derived its syphilis from the mother. Such errors as these are the chief cause of the doubt now resting on this question.

A syphilitic woman *may* bring forth a macerated child, but undeniable lesions of syphilis must be found on the child itself to prove its infection. The anæmic condition of the mother, and not the specific poison in her blood, may have caused the premature expulsion of the child.

Statistics show that syphilis contracted by the mother during pregnancy is a very prolific cause of premature birth. The aborted products, however, may differ in no respect from those met with in the case of mothers who have passed through some severe adynamic disease, having no specific nature whatever, and cannot be called syphilitic in the absence of undoubted lesions.

A syphilitic child may be born at full term of a mother infected at some time during gestation. It has often been assumed that in such case the disease is derived from the mother; on the contrary, it always is derived from the father. It is possible for a healthy woman carrying a syphilitic fœtus to become infected herself, since the disease of her embryo imparts to her no immunity. This fact has been cited as evidence of syphilis acquired by the mother through conception, the truth being that it was subsequently acquired directly from the father.

The importance of learning all the facts relating to father, mother, and child before drawing conclusions seems to have been often disregarded. As an illustration I may mention the article of Hutchinson<sup>1</sup> of London, in which, of six cases reported, not one bears out the theory advocated, some lacking most important details, while others are clearly instances of syphilis derived from the father.

The cases cited by Oewre, who also supports this theory, are equally unreliable for similar reasons.<sup>2</sup>

The hypothesis of Finger<sup>3</sup> as to the question of placental infection of the mother appeals to our reason, though we may have mild misgiving, since it is not proved that syphilis is really a bacterial disease. It is the rule that the placenta acts as a very perfect filter, and wholly prevents the passage of solid particles of matter. Now, following Finger, if we assume that the products of syphilitic infection are ptomaines or toxines which are soluble, and of tissue-elements which are solid particles, the deduction may be made that in the pregnant woman there is always

<sup>1</sup> "A Clinical Lecture on the Communication of Syphilis from a Mother to her Fœtus," *Med. Times and Gaz.*, Lond., Mar. 30, 1877.

<sup>2</sup> Among those who deny the theory in the most positive manner, and who furnish large numbers of trustworthy cases, may be mentioned Pick, Hennig, Köbner, Späth, Schaunstein, Bidentkap, Bärensprung, and Kassowitz. Bärensprung details fourteen cases, and says emphatically that he has never seen a syphilitic child born of a mother infected during pregnancy. The cases of Pick and Kassowitz are also especially valuable.

<sup>3</sup> "Die Syphilis als Infektionskrankheit vom Stand-Punkte der modernen Bacteriologie," *Archiv für Derm. und Syphilis*, 1890, pp. 340 et seq.



going on an interchange of serum between her and her offspring. Now, if this serum contains syphilitic toxines, it is fair to conclude that the mother receives a modified syphilitic infection or intoxication; she is, as we may say, vaccinated. This condition, while in all probability not rendering her syphilitic, confers upon her an immunity to the infection. On this subject Von Düring states that it is possible for micro-organisms to so damage the placenta by causing emboli, hemorrhages, and endothelial necroses that its filtering power is in a measure lost, and that through it solid particles may permeate. If all these hypotheses are true in essence, the conclusion is warranted that in some exceptional cases the healthy mother may be infected by her syphilitic fœtus.

Assuming that the toxine theory is scientifically true, we may infer that the pregnant woman who is infected with syphilis after conception nourishes her infant with a serum more or less rich in toxines, and that in proportion to the quantity and malignancy of the circulating poison the child is affected, and that when it is very intense death is produced.

The answer to the question above propounded is: *That in all probability the toxic principles of syphilis may be conveyed through the utero-placental circulation from mother to fœtus, and vice versâ, and that full infection may, in rare cases, occur when the filtrative power of the placenta has been impaired by morbid changes.*

The mothers who bear syphilitic children and present no evidence of infection may be thin and pallid or healthy and robust. Some authors think that they are the bearers of a modified syphilis, while still others claim that they later on may, and often do, present tertiary manifestations. In all probability those authors who claim that a modified syphilis has been produced are correct. Though Von Düring emphatically says that these women are in a latent tertiary condition and that they do later on present undoubted evidence of tertiary syphilis, and reports three cases, I think that we have not as yet a sufficiency of uncontrovertible facts to allow us to make magisterial statements. We want more well- and long-observed cases.

It is very certain, however, that these women acquire an immunity to syphilitic infection from others. On this subject Colles<sup>1</sup> says: "I have never witnessed nor heard of an instance in which a child deriving the infection of syphilis from its parents has caused an ulceration on the breast of its mother." In like manner, Baumès,<sup>2</sup> in speaking of a case, says: "This is in accord with the observed fact that a mother who has borne syphilitic children which derive the infection from the semen of the father does not contract syphilis in nursing her own offspring, while a strange woman may do so." Colles's statement of what he observed has passed current as Colles's law. Von Düring very happily formulates it as follows: "A healthy woman who, impregnated by a syphilitic man, has borne a syphilitic child, may be free of all symptoms of syphilitic infection, and may at the same time be refractory against any syphilitic infection."

This clinical fact has been verified by the results of experimental inoculation. Thus Caspary<sup>3</sup> reports the case of a woman who bore her

<sup>1</sup> *Practical Observations on the Venereal Disease*, London, 1837, p. 285.

<sup>2</sup> *Précis théorique et pratique des maladies vénériennes*, vol. i. 1840, pp. 180 et seq.

<sup>3</sup> "Ueber Gesunde Mütter hered. Syph. Kinder.," *Vierteljahr. für Derm. und Syph.*, 1875, p. 437.

husband when he was free from syphilis several healthy children. He then contracted the infection, and afterward she became pregnant and aborted, and gummatous changes were found in the placenta. Caspary inoculated this woman with the secretion of mucous patches, without any result. Finger<sup>1</sup> inoculated with syphilitic material three women in this condition, and failed to produce any effects. We are unable to say whether the immunity gained by these women is limited in duration or whether it exists during lifetime.

*Immunity due to Hereditary Syphilis.*—As a general rule, persons who have suffered from hereditary syphilis in early life possess an immunity against acquired infection. This rule has very rare exceptions. I published<sup>2</sup> the case of a woman who was infected at puberty, and who carried with her the disfigurements of early hereditary syphilis. Tavernier<sup>3</sup> has also reported two cases in which the probability exists that hereditary disease was followed later on by acquired infection.

W. Boeck<sup>4</sup> mentions the case of a child, the victim of hereditary syphilis, whom he treated in its first year by means of syphilization, and who returned when he was eighteen years old with the acquired disease.

Hutchinson<sup>5</sup> reports two cases in which young men of well-characterized heredito-syphilitic physiognomy had chancres which became inflamed and were followed by a "rupia rash." I am unable to convince myself that either of these two unfortunates presented satisfactory evidence of a late acquired infection.

Lang<sup>6</sup> mentions the case of a man twenty-five years old who had suffered until his eighteenth or twentieth year with a severe form of hereditary syphilis, who came to him with a typical hard chancre and swelling of the inguinal ganglia. The further history is not given.

Dowse<sup>7</sup> reports the case of a girl nine years old whose mother had had eight miscarriages, and whose upper central incisors were notched and irregular, but yet who gave no history of congenital syphilis. This girl was infected with syphilis from the condylomata lata of a neighbor's child, and had generalized syphilides and lesions of the *alæ nasi*, pharynx, larynx, trachea, and bronchi. She died of the disease.

### Transmission of Syphilis to the Third Generation.

Transmission of syphilis through two generations to the third has been claimed, and it may perhaps occur, but there is as yet no satisfactory evidence to prove it.

The proof would consist of the following facts.

1. The existence of syphilis in one or both grandparents.
2. A clear history of hereditary syphilis in the child.

<sup>1</sup> "Ueber Immunität gegen Syphilis," *Allg. Wien. med. Zeitg.*, 1885, No. 50.

<sup>2</sup> *Journ. of Cutan. and Gen.-urin. Diseases*, Dec., 1890.

<sup>3</sup> *Annales de Derm. et de Syph.*, 1887, pp. 513 et seq.

<sup>4</sup> *Undersogelser angaaende Syphilis*, Christiania, 1875, p. 270.

<sup>5</sup> "New Facts and Opinions as to Inherited Syphilis," *London Hospital Reports*, 1865, pp. 169 and 170.

<sup>6</sup> *Op. cit.*, Wiesbaden, 1884 and 1886, p. 458.

<sup>7</sup> *Medical Times and Gazette*, June 9, 1877, p. 630.

3. Proof (absolute) that the father of the child or the person of the woman spoken of in the second particular was free from syphilis.

4. That the child when fully grown had not been, and was not then, infected with acquired syphilis.

5. That her offspring undoubtedly had hereditary syphilis. Vague lesions should not be considered at all.

A number of cases have been published on this subject, but they are lacking in some essential fact.

In King's case<sup>1</sup> the mother was undoubtedly affected with syphilis prior to birth of the child or the father was syphilitic.

In Hutchinson's<sup>2</sup> case the only evidence pointing to syphilis in the child was chronic synovitis of the left knee.

In the case of Devasse<sup>3</sup> there is a history of syphilis in the grandmother, and in all probability hereditary syphilis in the grandchild, but there is no history of the mother at all, and that of the father is very unsatisfactory.

Atkinson<sup>4</sup> reported a case, the weak point of which is that the mother's eruption at puberty gives evidence of activity of infection. It was generalized and superficially papular, and indicated recent infection.

Dézanneau<sup>5</sup> also reports a case in which everything is assumed.

C. Boeck<sup>6</sup> reports a case in which the weak point is that the child was born with active syphilis of a mother twenty-nine years old who had previously had two healthy children.

### **Invasion and Evolution of Hereditary Syphilis.**

Before considering in detail the lesions of syphilis, its evolution and mode of invasion should be described.

The mortality of syphilitic children is very great, fully one-third dying before maturity. Abortion resulting from the death of the foetus usually occurs about the sixth month, while that caused by infection of the mother during pregnancy takes place somewhat later. An aborted foetus is usually in a macerated condition, the skin being easily detached and the surface having a livid purple color, and various lesions will be found in some of the viscera. The integument may show nothing characteristic or large bullæ may be found on the soles and palms.

In syphilitic children stillborn at term or dying soon after birth frequently no lesion of the skin is found. The greater number of syphilitic children born living appear well nourished and perfectly healthy, but, generally at the end of three weeks, evidences of disease show themselves. The date of evolution of syphilis has been noted by Kassowitz in 124 cases, in 11 of which it was the first week; in 21, the second; in 34, the third or fourth; in 40, it was the second month; and in 18, the third month. The time seems to depend upon the varying intensity of foetal infection, the early appearance of symptoms indicating a virulent type of disease.

<sup>1</sup> *Journal of Cutan. and Gen.-urin. Diseases*, vol. vii., 1889, pp. 328 et seq.

<sup>2</sup> *London Hospital Reports*, 1865, pp. 153 et seq.

<sup>3</sup> *Syphilis ses formes son unité*, Paris, 1865, p. 366.

<sup>4</sup> *Archives of Dermatology*, vol. iii., pp. 106 et seq.

<sup>5</sup> *Annales de Derm. et de Syph.*, 1888, pp. 162 et seq.

<sup>6</sup> *Ibid.*, 1889, pp. 782 et seq.



The **prognosis** in the case of syphilitic children is always unfavorable, death from marasmus often ensuing within a month, but it becomes less serious the later the appearance of active symptoms.

The first indication of disease in a child apparently healthy at birth is the characteristic *snuffling*, which is the cause of great discomfort, and in some cases death ensues from the obstruction to breathing. Emaciation may progress to such an extent as to leave the skin of the body loose and wrinkled. The integument of the face seems to be drawn tight over the bones and assumes an earthy sallowness. The eyes become prominent, and the juvenile expression is lost until these children come to look like little old men and women. In some cases, however, even of children intensely diseased, excessive emaciation is not observed, so that there seems to be no special relation between this condition and the activity of the disease. Simultaneous with these changes the child's nutrition suffers, gastro-intestinal and pulmonary lesions may be developed, and various skin eruptions make their appearance.

### Eruptions of Hereditary Syphilis.

The principal eruptions are—the erythematous syphilide, or roseola; the papular syphilide; the vesicular, the pustular, the bullous, and the tubercular syphilides; and a form of furuncle.

With certain modifications the features of syphilitic eruptions in infants are similar to those in adults. In both cases they appear in crops, but in the hereditary disease the later rashes are less symmetrical, and are likely to be limited to particular regions, and the fever accompanying an eruption in the acquired disease is frequently absent. Although their general course is subacute, yet on account of the activity of cell-growth and circulation in the integument of infants the eruptions are developed rapidly and tend to involve extensive surfaces. It may also be noticed that such lesions as papules and condylomata are less firm and solid than similar ones in adults.

The erythematous, papular, tubercular, and gummatous eruptions are essentially the result of syphilitic processes, while all the ulcerative rashes are the outcome of a symbiosis of syphilis and pyogenic bacteria.

*The Erythematous Syphilide, or Roseola.*—This is the most frequent and earliest hereditary eruption, appearing about the third week, and often preceded or accompanied by coryza. It begins on the lower part of the abdomen as minute round or oval pink spots, which at first disappear on pressure. It rapidly invades the trunk, face, and extremities, and is generally fully developed within a week. The spots then vary from a third to half an inch in diameter, assume a dull-red coppery hue, and no longer disappear on pressure, owing to pigmentation of the skin. In some cases, as in adults, punctæ of a deeper color are seen on the surface of the roseolous patches, denoting the situation of follicles around which the hyperæmia is more intense.

The patches are not usually elevated, and desquamation is generally absent, except in severe cases about the hands, feet, and nates, where it may be limited to the margins of the patches, or it may be so extensive as to resemble psoriasis. Sometimes the spots run together and fissures form, either superficial or of sufficient depth to cause much pain.

The early change of color to a coppery hue, seen in irregular patches upon the chin, in the folds of the neck, and on the nates, where other lesions frequently coexist, is an important diagnostic feature.

The tendency to a circular form, so common in acquired syphilis, is observed in later hereditary eruptions more frequently than in roseola.

The eruption is sometimes so evanescent and its color so faint that it passes unobserved. By attention to the characteristics mentioned and to the history of the patient the diagnosis will generally be sufficiently easy.

*The Papular Syphilide and Condylomata Lata.*—These lesions will be described together on account of their pathological similarity.

The papular syphilide may be the first eruption, and not unfrequently it is intermingled with a roseola, or three or four different syphilides may be seen at the same time on one child. The small acuminate papule of acquired syphilis is scarcely ever seen, except in a relapse or late in the course of the disease. Flat papules, small and large, scattered symmetrically over the body are the common forms. Crescentic grouping is seldom seen except at a late period, and then only about the joints and on the extremities. The papules, at first dull red, and then coppery, may have a smooth surface, or the epidermis may exfoliate, especially on the soles and palms.

In this connection may be mentioned certain diffuse infiltrations sometimes observed which have not yet been carefully described. When papules are copiously distributed upon the palms and soles, it may be noted that they increase rapidly in size and number and fuse together. The skin is of a dull-red color, much thickened and scaly. An entire foot or hand, or the gluteal region from the thighs to the top of the sacrum, may be thus involved.

Irritation from active movements or from pressure often excites fissures and ulceration, which are the cause of much suffering. This condition may accompany any lesion of hereditary syphilis; its course is chronic, and it is not, as a rule, affected by internal medication. The duration of the hereditary papular syphilide depends upon treatment, to which it promptly yields.

Condylomata lata are simply modifications of the papular syphilides, due to their situation between the folds of skin or at its junction with mucous membranes or wherever there is moisture. The change in the papule is chiefly hypertrophic, there being no decided histological difference between the two forms of eruption. In size condylomata vary; their shape is governed by the conformation of the parts upon which they grow; and in color they are usually grayish-pink to dark brown. Their surface is generally flat, sometimes fissured and ulcerated, when a scanty offensive secretion exudes, which may form a thin dirty-colored crust. Particularly in cachectic infants a false membrane may form, which is slightly adherent, and leaves a raw, bleeding surface on removal.

When condylomata reach a diameter of more than an inch—an unusual size—the margins become elevated and rounded and end abruptly in the surrounding skin. The latter may be of its natural tint or hyperæmic, or it may be the seat of the diffuse infiltration already spoken of.

Condylomata are among the early and most obstinate of hereditary lesions, local measures appearing to have more effect upon them than internal medication. They vary greatly in number, and in infants are most frequently seen about the anus. A characteristic symptom is exhibited when they exist at each angle of the mouth, associated with mucous patches in the buccal cavity. They are much aggravated by neglect and want of cleanliness, but with proper care and treatment they shrink and disappear, leaving a temporary copper-colored stain.

*The Vesicular Syphilide.*—This rare form of eruption occurs among the early symptoms in severe cases of hereditary syphilis. It is never general, but is usually associated with a pustular or bullous eruption, and appears in groups of vesicles, closely and irregularly packed together, upon the chin and about the mouth, upon the forearms, the nates, the hypogastrium, or the thighs. It rarely shows a tendency to relapse.

The size of the individual vesicles varies. The smallest are about two lines in diameter, and elevated about one-quarter of a line above the general surface, or conical, contain transparent serum, and are situated upon a firm infiltrated base which has a brownish-red color. Larger vesicles seem to be situated upon papules, and their contents are sero-purulent. Unlike eczema, the distinct vesicles show a tendency to remain isolated and to involve deeper portions of the skin, and rarely coalesce to form superficial weeping patches. Though chronic in its course, this eruption generally yields to internal or topical treatment.

*The Pustular Syphilide.*—This eruption usually appears before the eighth week in children profoundly syphilitic, but is not infrequently seen in those whose nutrition is fair. The later it appears, the more likely are the pustules to be small, few, and superficial. It may invade the entire body, but is usually more abundant on the thighs, buttocks, and face, while elsewhere the pustules are thinly scattered and irregular.

The pustules vary from a third of a line to a line in diameter at their bases, and from a third to half of a line in elevation. The deep-red color of their thickened bases ends abruptly at their margins. They may remain intact for many days, and after rupture the ulcerated surface may or may not become incrustated. Especially about the mouth there is a tendency to grouping and the formation of quite extensive patches, or the whole head and face may be thus involved. The crusts are generally darker than those of eczema and contagious impetigo, and the ulceration beneath is deeper. Itching and burning are usually slight, but much uneasiness and even suffering may be caused in certain locations, as when pustules form on the scrotum, the buttocks, or the face. Groups of pustules, attended by much redness and thickening of the surrounding skin, may form on the palms and soles, and the nails may be destroyed by pustules developed around them or beneath their free extremities.

This eruption usually leaves no permanent trace, but in some cases marked loss of tissue and scarring result, which become less noticeable as the child grows older. Sometimes alopecia results from cicatrices on the scalp; the free border of the lips or the angles of the mouth may be partially destroyed.

The pustular eruption may or may not be associated with some other form, the vesicular being seen with it most frequently. When a second pustular eruption is developed within the first three or four years of the



disease, it is apt to be much more limited in extent than the first, but in other respects is precisely similar.

*Furuncular Eruptions.*—As early as the sixth month or as late as the third year crops of furuncles may appear, constituting the sole symptom of hereditary syphilis or associated with other lesions. If symmetrically arranged, as they usually are, they are quite numerous; if irregularly distributed, they are few. They differ in some respects from ordinary furuncles.

Their bases are usually compact, well defined, and of a dull coppery-red color. Their formation is slow and without signs of active inflammation. They begin as a small nodule in the corium, and gradually increase to the size of half a nutmeg. A superficial ulcer forms at the summit of the nodule, and a mass of slough comes away, leaving a deep cavity with irregular, unhealthy walls and everted discolored margins, which may remain in a sluggish condition for many weeks or may increase in dimensions. The discharge is scanty and offensive. The duration of these lesions is from one to several months, and repair is often followed by permanent cicatrices.

Several older writers have referred to certain ulcers about the heel and ankles as being diagnostic of hereditary syphilis. These ulcers are simply the results of pustules or bullæ, which are often developed in those situations, and are liable to irritation, which renders them very persistent.

*The Bullous Syphilide—Pemphigus.*—This eruption, sometimes seen at birth and sometimes a month or six weeks after birth, is always indicative of a severe form of hereditary syphilis, and is frequently a precursor of death. As regards its situation, it resembles the pustular syphilide, but the palms of the hands and the soles of the feet are most frequently attacked, the lower extremities being most extensively involved, while upon the trunk the bullæ are sparsely scattered.

Diffuse infiltration, ulceration, and the formation of fissures may attend the development of this eruption upon the thighs and buttocks and upon the extremities. It may accompany pustules and, less frequently, one or more of the other syphilides, is generally copious, and is always symmetrical. The bullæ are developed rapidly, and their seropurulent contents soon become purulent. They are surrounded by a rim of thickened integument of a coppery color, and, unlike other forms of pemphigus in children, lack uniformity of shape, some being conical, others rounded, and still others flattened.

Although they are developed rapidly, the subsequent course of bullæ is chronic. After having been ruptured their progress is similar to that of pustules. This syphilide differs from every other form of eruption in being limited to a single outburst, rarely or never relapsing.

*The Tubercular Syphilide.*—This lesion, much rarer in hereditary than in acquired syphilis, may occur as early as the sixth month, or, as a second attack, may be met with several years after birth. The tubercles begin as deeply-seated papules or as small movable nodules, in the latter case greater depth of tissue being involved. The skin soon becomes implicated, and a sharply-defined tumor, from a quarter of an inch to an inch or more in diameter, results, which may disappear leaving no trace, or it may break down into an ulcer which is very persistent and demands local as well as constitutional treatment.

Regions where the connective tissue is loose and abundant are the favorite seat of tubercles of the largest size. Their surface sometimes becomes scaly, and the eruption then resembles psoriasis. Similar eruptions are also seen in scrofulous children, but the greater surrounding hyperæmia, which is of a bluish rather than a coppery color in the scrofulous affection, and the points already given in the description of ulcerations of acquired syphilis, may aid in the diagnosis.

*Gummata and Gummatus Ulcers.*—These lesions sometimes appear as early as the third year, but generally later, even as late as the twentieth year. After this period it is not usual for ulcerations to have the features of hereditary syphilis, typical gummata having been observed by me in only one instance.

The course of these lesions in hereditary syphilis is similar to that in acquired, and therefore needs no additional description.

### Affections of the Mucous Membranes.

One of the earliest and most constant symptoms of hereditary syphilis is coryza, which is due to structural changes in the mucous membrane of the nasal passages. A few days before the appearance of general manifestations there may appear a serous discharge from the nostrils, sometimes trifling, sometimes so excessive as to impede respiration, especially during sleep and in the act of nursing. This discharge is accompanied by the characteristic "snuffling."

The nasal secretion soon becomes purulent, bloody, and very offensive, and causes swelling and excoriation of the alæ nasi and upper lip. Tenacious crusts composed of the dried secretions form on the inflamed surfaces, causing much discomfort. In its mildest and rarest form this affection is a simple erythema. Generally, ulceration of the mucous membrane ensues, and not infrequently the disease progresses to the bony structures, producing necrosis, with perforation or even entire destruction of the septum, followed by striking deformity.

The intensity and chronicity of specific coryza, the limitation of the disease to the nasal passages, and the coexistence of other syphilitic manifestations are sufficient to establish the differential diagnosis.

*Mucous Patches of the Mouth.*—In the infant these lesions often lose their characteristic appearance quite early. At first they consist of slightly elevated portions of mucous membrane with whitish surfaces and surrounded by erythematous areolæ. The pearly epithelial covering may be soon cast off, leaving a smooth red surface, slightly depressed, which may ulcerate. The regular outline of the round or oval patches may be lost and a number coalesce, thus involving a considerable extent of surface, which may be superficially ulcerated, and in cachectic subjects is often partially covered by an extremely adherent false membrane of a pale brown color. The patches frequently become hypertrophied and resemble condylomata lata.

In the early course of hereditary syphilis very many distinct mucous patches may be counted; at a later period they are less numerous, but they show a decided tendency to relapse, having been seen by me as late as the sixth year.

The most common situations of this lesion are the angles of the mouth,

the mucous membrane lining the cheeks, the pillars of the fauces and the tonsils, the sides and frequently the dorsum of the tongue, and also very often the portions of the gums adjacent to the teeth. On account of the difficulty of pharyngeal examination in young infants we cannot state positively the frequency of the invasion of this region. There is certainly less tendency to extensive ulceration of the pharynx and tonsils in infants than in adults. At the angles of the mouth the ulceration is often extensive and painful.

The serous secretion of mucous patches is rather free, and quite as infectious as that of the initial lesion. Hence the necessity of their early recognition, and of measures to prevent contagion. Nursing at the breast of any one but the mother, kissing and fondling, must be prohibited, and great care and cleanliness must be observed in the use of bottles, cups, etc. The infection of the nurse by a child having mucous patches of the mouth is particularly liable to occur in hospitals and in lying-in asylums. An instance of this mode of contagion has been reported by me in a paper in which this question is fully considered.

Only when ulceration exists, or when the mucous patches are complicated with diphtheritic membrane, is their diagnosis from stomatitis, simple or parasitic, attended by difficulty. In the absence of distinctive features in the history and on the body of the child our decision must be based on the local appearances. In simple stomatitis the inflammation is generally more diffuse, the whole tongue in particular being intensely affected, and often covered with vesicles which are not seen in the specific disease. The tendency of mucous patches to development at the angles of the mouth is a valuable point in diagnosis. In parasitic stomatitis the inflammation is less localized than in the specific, the general hyperæmia is greater, and the false membrane has a whiter color and a more patchy appearance. In both forms of non-specific stomatitis the sulci between the gums and cheeks and the gums themselves are often involved, rarely in the specific.

The history of the case, therefore, and the comparatively circumscribed character and limited distribution of mucous patches, will enable us to make a diagnosis.

*Gummatous Infiltrations.*—These lesions, consisting of cellular infiltration of the mucous membrane, are usually developed upon the hard palate or upon the posterior pharyngeal wall, when they may be mistaken for retro-pharyngeal abscess. They are rarely seen before the third year of life, and generally occur from the sixth to the twelfth. The first indication of their formation is a reddish elevation of the mucous membrane, forming a round or oval patch from half an inch to an inch and a half in diameter, which increases in size and in prominence until a well-defined tumor results. Necrotic changes almost invariably occur in the tumor, leaving an ulcer with sharply-cut, undermined edges and tenacious greenish secretion, involving the mucous membrane even to the subjacent bone.

Their course is chronic, with slight tendency to invade surrounding parts. Upon the hard palate they give little trouble, but upon the wall of the pharynx they are the source of much suffering and inconvenience in swallowing. The health may be further impaired by the copious secretions and the noxious gases developed. Repair of the ulceration is followed by cicatricial contractions, which on the hard palate may affect



phonation, and on the wall of the pharynx may interfere with deglutition. The diagnosis is generally easy.

In tuberculous ulceration of the hard palate the process is more active and less sharply limited, while other evidences of phthisis exist. Retro-pharyngeal abscess is much more acute in its invasion and progress than a gummy tumor, and in the latter case signs of pre-existing syphilitic lesions may be found. In all cases the previous history of the patient must be learned.

### Affections of the Larynx.

In the early periods of hereditary syphilis the larynx and upper air-passages may be the seat of simple hyperæmia, of mucous patches, or of ulceration involving the mucous membrane, or even the cartilages, to such an extent as to result in stenosis.

Coincident with, or following, gummatous infiltrations into the pharynx similar lesions may attack the larynx. In 6 cases observed by Dr. George M. Lefferts destruction of this organ in varying extent was found. In 3 cases the disease was limited to the epiglottis, which in 2 was totally destroyed, and in 1 there was loss of half of its free border. In 1 of the 2 cases of total destruction the ulceration had extended to the right arytenoid epiglottic fold. In the remaining 3 cases there was general destruction of the superior laryngeal tissues with resulting stenosis. In all of these cases there was greater or less destruction of the pharynx, and the laryngeal affection was probably an extension of the morbid process from that region. Our knowledge being as yet so limited, we cannot, of course, state that the laryngeal affections are always secondary to those of the pharynx, though the histories of these cases warrant that view. It remains for future observation to determine whether, in the course of hereditary syphilis, the larynx is primarily attacked, with or without attendant lesions of the pharynx. The ages of the affected children varied between ten and eighteen years, and the histories of all of them gave evidence of inherited syphilis.

Like gummatous affections of the pharynx, those of the larynx belong to the late manifestations of the disease. Like them, also, their course is quite rapid, and unless promptly checked they produce great deformity. Their symptoms are a varying degree of hoarseness and even total loss of voice, with difficulty of respiration in the more severe cases. Iodide of potassium in full doses should be given. These affections are quite rare, and their existence is not even mentioned in most text-books.

Dr. J. H. Mackenzie,<sup>1</sup> from a personal study of one hundred and fifty cases, and from those in literature, states that these lesions are not rare, and may be observed at any period of the disease, but that the most common period of invasion is in the first six months after birth. In the throat the most frequent seat of invasion is the palate, more especially the hard palate. Then, in order of frequency, are the fauces, nasopharynx, the posterior pharyngeal wall, the nasal fossæ, the septum narium, the tongue, and, last, the gums. These ulcers show a tendency to centrality of position, and are prone to be followed by caries and necrosis. The prognosis, according to Mackenzie, is largely dependent

<sup>1</sup> "Congenital Syphilis of the Throat," *Am. Journal Med. Sciences*, Oct., 1880.

upon the age of the child, being most grave in the very young. While deep ulceration of the larynx is at all periods serious, those of the pharyngo-laryngeal region are especially so, and are usually followed by death when they appear within the first year of life. Later in life these lesions are much more amenable. Mackenzie recommends for acute laryngeal syphilis mercurial inunctions over the thyroid body, the inhalation of calomel and iodate of zinc in the form of vapor, and the heroic use of iodide of potassium. In very urgent cases tracheotomy must be resorted to. In chronic cases the mixed treatment may be used with benefit. This author speaks highly of the beneficial results obtained in the use of iodoform locally, and of the iodate of zinc in vapor form.

### **Affections of the Lungs.**

Interstitial cell-proliferation, complicated in some instances with gummatous infiltration, are the lesions usually found in hereditary syphilitic infants.

When the lesions are extensive and fully developed the lung is reduced in size, increased in consistency, and when cut is found to be firmer and less vascular than normal. Scattered upon the surface of the lung and through its substance, on the smaller vessels and bronchi, which are much thickened and look like yellow cords, are numerous nodules of various sizes. The more recent are small and of a grayish-pink color; the older ones may be the size of a filbert, are light yellow, and when excised exude a thin milky fluid, while serum escapes from the lung-substance. The former appear to be homogeneous, while the latter are granular and may contain pus. The pulmonary pleura, especially in the vicinity of the nodules, is thickened and opaque.

The entire lung is usually more or less involved in the morbid processes, though in some cases the nodules may be few and confined to a portion of a single lobe.

The first step in the process is evidently active congestion, followed by cell-proliferation around the bronchioles, and in a less degree in the walls of the capillaries, resulting in partial or complete obstruction of their lumen and consequent destruction of the function of the lung tissue.

The nodules, which represent one or more plugged and distended alveoli, consist of a mass of connective-tissue cells, fibrous tissue, granular débris, and perhaps some gummatous tissue. Like all new growths, they are liable to degeneration, fatty or caseous, and may contain pus in their centres. The pleural changes are due to hyperæmia and increase of fibrous tissue. True gummatous nodules have been found by some observers. While two forms of nodules, the gummatous and the connective tissue, may exist, their gross and microscopical appearances are in some cases so very similar that it is impossible to distinguish them. The gray hepatization of pneumonia resembles syphilitic induration, but may be recognized by the greater succulence and less resistance of the lining tissue and by the escape of true pus on pressure. Owing to the nature and extent of these pulmonary lesions life is, in most cases, destroyed. They may, however, exist in a moderate and localized form without such a result.

A child five months old who had passed through the earlier period of

its disease, having had a papular and pustular eruption, developed broncho-pneumonia, with dulness on percussion, imperfect expansion, and harsh respiratory sounds, with slight crepitation at the right apex and over lower lobe of the left lung. Although there was excessive cough, the increase in pulse-rate and in temperature was very slight, and no acute symptoms of any kind were exhibited. This condition lasted fully six weeks, and finally yielded to the mixed treatment in gradually increasing doses. I examined this infant six months later, and there were no perceptible traces of the lesion in either lung. I have seen two cases, essentially similar both in course and method of cure, in which lesions of the bones, joints, eyes, and integument were also present.

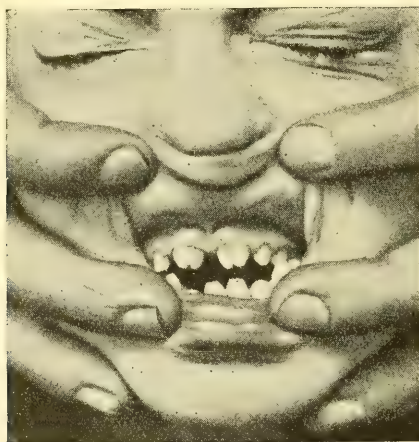
While these changes usually take place in intra-uterine life, we may find them at any time when the syphilitic diathesis is active, but most frequently within the first eighteen months of life. They are not attended by much systemic reaction, and may be developed in any portion of the lungs either symmetrically or unilaterally.

### Deformities of the Teeth.

The teeth sometimes are much changed in hereditary syphilis.

Mr. Hutchinson, who first described this affection, says: "As diagnostic of hereditary syphilis various peculiarities are often presented by the other teeth, especially the canines, but *the upper central incisors are the test teeth*. When first cut these teeth are usually short, narrow from side to side at their edges, and very thin. After a while a crescentic portion

FIG. 229.



Hutchinson's teeth.

from their edges breaks away, leaving a broad, shallow, vertical notch which is permanent for some years, but between twenty and thirty usually becomes obliterated by the premature wearing down of the tooth. The two teeth often converge, and sometimes they stand widely apart. (See Fig. 229.) In certain instances in which the notching is either wholly absent or but slightly marked there is still a peculiar color ('a dirty



brownish hue resembling that of bad size '1), and a narrow squareness of form, which are easily recognized by the practised eye." The first set of teeth do not exhibit this malformation.

### Affections of the Peritoneum.

Primary morbid changes are rarely, if ever, seen in the peritoneum. Thirty-one cases in which general or partial uncomplicated inflammation of this membrane was distinguished have, indeed, been reported by Simpson, who claims the existence of true peritonitis.

The syphilitic origin of many of these cases was, however, doubtful, and in some the exact condition of the viscera was not observed. Chronic adhesive peritonitis, more or less localized and unattended by marked symptoms, often occurs, originating in some syphilitic visceral change, particularly of the liver.

### Affections of the Intestines.

The intestines are frequently the seat of microbic invasion early in hereditary syphilis, and from this cause gastric and bowel troubles are developed. The intestines may be the seat of structural change.

Förster<sup>2</sup> has described a fibroid degeneration of Peyer's patches in a syphilitic infant who died six days after birth with lobular pneumonia and purulent bronchitis. The glandular structure of the patches had been replaced by elevated grayish-red masses, with smooth surface and yellowish centre, composed of nuclei, cells, and fibres of connective tissue. Similar observations have been made by Eberth,<sup>3</sup> Roth,<sup>4</sup> and Oser,<sup>5</sup> who have described an affection consisting of multiple circumscribed indurations, varying in size and generally circular, situated on a level with Peyer's patches and the solitary glands, the surrounding mucous membrane being smooth and slate-colored or more or less ulcerated. The latter condition resembles that of a dry eschar, but leaves an ulcer with a bright lardaceous base. This lesion, consisting of an infiltration of cells similar to those of lymphatic glands and of connective tissue, is usually limited to the submucous stratum.

### Affections of the Liver.

The functional activity of the liver in infancy renders it subject to profound structural changes, which consist chiefly of connective-tissue infiltration. The credit of first calling attention to this important lesion belongs to Gubler,<sup>6</sup> from whose writings the following clear and complete description is obtained:

"When the lesion has reached its maximum the liver is sensibly hypertrophied, globular, and hard. It is resistant to pressure, and even when

<sup>1</sup> "On the Means of Recognizing the Subjects of Inherited Syphilis in Adult Life," *Medical Times and Gaz.*, Lond., Sept. 11, 1858, p. 265.

<sup>2</sup> *Wüzb. med. Ztschr.*, Band iv. part 1, 1863.

<sup>3</sup> "Ueber syph. Enteritis," *Arch. f. path. Anat.*, etc., xl. p. 326, 1867.

<sup>4</sup> "Enteritis syphilitica," *ibid.*, xliii. p. 298.

<sup>5</sup> "Fälle von Enteritis syphilitica," *Arch. f. Dermat. u. Syph.*, iii., 1870, pp. 27 et seq.

<sup>6</sup> "Mémoire sur une nouvelle Affection du Foie, liée à la Syphilis héréditaire chez les Enfants du premier âge," *Gaz. med. de Paris*, 1852.

torn by the fingers its surface receives no indentation from them. The elasticity of the organ is such that if a wedge-shaped piece taken from its thin edge be pressed it escapes like a cherry-stone and rebounds from the ground. When cut into it creaks slightly under the scalpel. The distinct nature of its two substances has completely vanished. On a uniform yellowish ground a more or less close layer of small, white, opaque grains is seen, having the appearance of grains of semola, with delicate arborescences formed of empty blood-vessels. On pressure no blood is forced out, but only a slightly yellow serum, which is derived from the albumin. Gubler has only three times seen the change carried to this extent. It is most frequently much less marked. Thus, the tissue of the organ is firm, without having that extreme hardness and yellow color, which might admit of comparison to some kinds of flint. The interior of the organ presents rather an indefinite color, shaded with yellow or brownish-red, more or less diluted; but in no part is the parenchyma quite healthy in appearance.

“Again, the change may be found in circumscribed parts only. Gubler has seen it confined to the left lobe, to the thin edge of the right lobe, and to the *lobulus Spigelii*. He ascertained by injections that in the indurated tissue the vascular network is almost impermeable, that the capillary vessels are obliterated, and that even the calibre of the larger vessels is considerably diminished. Microscopical examination enabled him to discover the cause of this disposition by revealing in the altered tissue of the organ, in every degree of change, the presence of fibro-plastic matter, sometimes in considerable, sometimes in enormous, quantity. In the portions intervening between the diseased parts the cells of the hepatic parenchyma maintain all the characteristics of their normal condition. The physical consequences of the deposit of these elements are an increase in the volume of the liver, the compression of the cells of the acini, the obliteration of the vessels, and the consequent cessation of the secretion of bile. In all the subjects examined after death by Gubler he always found the bile in the gall-bladder of a pale yellow color and very sticky; that is to say, very rich in mucus and very poor in coloring matter.”

Later observations confirm the results obtained by Gubler, and add much to our knowledge of the microscopic changes found in the liver. The primary changes are vascular. The walls of the vessels are much thickened, and around the tunica adventitia numerous nuclei and cells, with an abundance of fine fibrillar connective tissue, are found. The calibre of some of the vessels is diminished, and that of others is entirely obliterated. Moreover, various stages of fatty degeneration of the hepatic cells are found. Increase of connective tissue is observed in the parenchymatous network of the organ and in the capsule, which may be thickened either in its entire extent or especially on its upper surface. Adhesions may form between the convex surface and the diaphragm or the peritoneum of the anterior abdominal wall. Certain changes in the veins have been described by Schüppel,<sup>1</sup> under the title “peripylephlebitis syphilitica,” which are undoubtedly a part of the morbid process.

Gummous hepatitis in hereditary syphilis is admitted by several authors. There are two forms, one consisting of numerous minute tumors scattered through the liver, called by Wagner miliary syphilome; and the

<sup>1</sup> *Archiv der Heilkunde*, xi., 1870, pp. 74 et seq.

other consisting of one or more large circumscribed tumors, such as are found in the adult. Either of these lesions may be accompanied by the fibro-plastic infiltration of Gubler.

The clinical history and microscopic anatomy of this affection have been carefully studied by Rochebrune,<sup>1</sup> a former student of Gubler. This observer thinks that a diagnosis may be made from the following symptoms: A deep wine-colored venous stasis and œdema of the lower extremities, often accompanied by pemphigus; ascites, due to mechanical obstruction of the circulation, as in cirrhosis; a more or less pronounced chloro-anæmic appearance of the face; and the presence in the urine of albumin and hæmato-globulin. Vomiting may occur, and constipation, alternating with diarrhœa, has been observed. Icterus, symptomatic of this affection, has not been noticed. A fatal result commonly ensues in the early weeks of the child's existence.

A case of fatal icterus is reported by Bar and Renon<sup>2</sup> in a new-born child whose mother was syphilitic. At the autopsy the liver was found to be hypertrophied and the seat of gummata. Portions of tissue taken from the liver, spleen, and some blood when cultivated, showed very clearly the proteus vulgaris. This organism had infiltrated the intracellular space of the liver.

### Affections of the Spleen.

In cachectic children and in those in whom the disease assumes a severe form more or less hypertrophy of the spleen is sometimes observed, usually during the early stages of syphilis. The enlargement is rapid, the size of the organ often being quadrupled in two or three weeks. This condition may persist, according to Barlow, even for a year, while, on the other hand, mercurial treatment induces its rapid subsidence.

Although we are ignorant of the pathology of this affection, the acuteness of its invasion and its rapid involution suggest hyperæmia rather than permanent cell-growth. Still, it is quite possible that cellular hyperplasia may take place in the spleen, as it does in the liver. Lance-reaux says that the hypertrophied spleen is firm and smooth, that it sometimes becomes adherent to other organs, that the condition is often a simple multiplication of cell-elements, and that affections of the liver, and perhaps of the lymphatic glands, generally coexist.

Gee, who first described the affection in 1867, stated that it occurs in at least one-half the cases of hereditary syphilis, and in one-fourth hypertrophy is excessive and accompanied by a similar condition of the liver and the lymphatics. In two post-mortem examinations he found enlargement and induration, without evidence of gummatous infiltration or of amyloid degeneration.

In view of its gradual diminution as the general condition of the child improves, splenic hypertrophy is regarded by Gee and Barlow as an evidence of the severity of the syphilitic cachexia.

According to Parrot,<sup>3</sup> there are two forms of splenic lesion caused by hereditary syphilis. The first is an hypertrophy, in which the organ may

<sup>1</sup> *Thèse de Paris*, 1874.

<sup>2</sup> *Comptes Rendus de la Société de Biologie*, May 24, 1895.

<sup>3</sup> *Mouvement Méd.*, Paris, 23 Nov., 1872.



become three times its natural size, which, he thinks, is a secondary result of portal obstruction caused by diffuse infiltration of the liver, the spleen then being compelled to serve as a reservoir of the blood. The second form is an inflammation resulting in the formation of false membranes around the capsule of the organ. Parrot is not positive regarding the future course of these lesions, but is inclined to attribute to them certain lardaceous degenerations found later in the life of children who suffered from hereditary syphilis at their birth. He thinks that these lesions were the cause of rupture of the spleen in the case of a new-born child with hereditary syphilis, the details of which were reported by Charcot in 1865.

Affections of the spleen have been studied also by Birch-Hirschfeld<sup>1</sup> in thirty-two cases of hereditary syphilis. He found the organ much enlarged, but was unable with the microscope to discover any abnormality. The spleen of a foetus born in a macerated condition was soft and of a dirty-violet color. In case of still-birth or of death soon after birth the density of the organ was increased and its color was dark brown. Two forms of lesion of the spleen are therefore recognized by Hirschfeld: in one the organ is indurated and of a dark-brown color; in the other it is soft and pale.

### Lesions of the Pancreas.

The changes in the pancreas caused by hereditary syphilis have been carefully studied by Osterloh, Oedmansson, Wegner, and most extensively by Birch-Hirschfeld.<sup>2</sup> The last mentioned observer found in thirteen syphilitic children who died during or soon after birth varying degrees of morbid change. In the most marked cases the organ was much enlarged, its weight was doubled, its tissue firm, and on section it presented a glistening white appearance, somewhat like that of scirrhus, the granular substance being very indistinct. Under the microscope the interstitial connective tissue, especially between the larger lobules, was found greatly increased. Portions of lobules were compressed, and their epithelium was atrophied and in a state of fatty degeneration. The vessels of the interstitial tissues were few and their walls were thickened. This extreme degree of the process was observed in seven cases; in six the changes were less perceptible, and the lobules could be distinctly seen, although the organ was enlarged and rather denser than normal. The head of the organ was more altered than the tail.

Hirschfeld thinks that this marked change begins late in intra-uterine life, since it is rarely found in macerated foetuses prematurely born. The most marked case was that of a child who died five months after birth.

It is probable that this degeneration of the pancreas is one of the causes of gastro-intestinal disturbances in hereditary syphilis.

### Affections of the Kidney.

Our knowledge of the condition of the kidney in hereditary syphilis is very limited. Lancereaux states that he has found connective-tissue

<sup>1</sup> "Zur pathologischen Anatomie der hered. Syphilis," *Arch. d. Heilk.*, Leipz., Feb., 1875.

<sup>2</sup> "Beitr. zur path. Anat. der hered. Syph. Neugeborenen," *Arch. d. Heilk.*, Leipz., Feb. 5, 1870.

proliferation with fatty degeneration of the epithelium lining the tubuli uriniferi. The organs were firm and of a yellow color. Bradley reports the case of a syphilitic child four months old, with dropsy and albuminuria, who was cured by mercurial treatment.

The studies on the pathological anatomy of the kidney by Parrot show that these organs are studded with numerous small tumors, varying in size from a pin's head to a cherry-stone. The smallest were white, and the larger were yellow at their periphery and reddish in their centre. In some spots there was partial destruction of the renal tissue, and there were also infarctions. The lesion consists of a circumscribed or diffuse infiltration of round embryonic cells, with others of fusiform shape, into the connective-tissue framework, followed by compression or destruction of the tubules and colloid degeneration of their epithelium. In the early stages of this affection the organs become much enlarged, and Mollière reports a case in which they were found to be twice their normal size. Gradual atrophy follows degeneration of the new cells, and the organs may finally become much reduced in size.

### **Affections of the Suprarenal Capsules.**

Lancereaux has noted enlargement of these organs in a large number of cases. Virchow has also observed it, and speaks of a case in which complete fatty degeneration was found—a condition met with also by Hulke. According to Lancereaux, proliferation of young connective-tissue cells in the cortical substance has been found by Bärensprung. In a case in which the left suprarenal capsule was enlarged and adherent to the diaphragm Hennig found its contents gelatinous.

### **Affections of the Testicles and their Appendages.**

Though it was formerly stated that the testicles are not affected in hereditary syphilis, there is to-day so much evidence from many careful observers that syphilis does attack these organs in hereditarily infected children that it is almost unnecessary to mention this old-time contention. My own experience is sufficient to warrant me in offering a succinct account of these affections, but I have availed myself of a rich literature in order to more thoroughly elaborate this subject.

The most common affection is orchitis, and, while inflammation of the epididymis is sometimes observed, it is almost always as a complication of orchitis. Involvement of the vas deferens is quite uncommon, but occurs as a complication of the epididymo-orchitis. Neither of these affections is really of frequent occurrence, as shown by the fact that in literature something like fifty cases are more or less fully described or alluded to. Testicular affections are among the rarer manifestations of hereditary syphilis. Pathologically, the testicular lesion has been recognized by Hutinel<sup>1</sup> as early as the ninth and twenty-third days of birth. Clinically, however, it is seen generally in children from three to six and twelve months old, and in diminishing frequency in the second or third years. Somewhat exceptionally it is seen in later years, as in my sixth

<sup>1</sup> "Étude sur les Lésions syphilitiques du Testicule chez les Jeunes Enfants," *Rev. mens. de Méd. et de Chir.*, Paris, Feb., 1878, pp. 107 et seq.

case at fifteen, and in a case mentioned by Fournier<sup>1</sup> at twenty-four. My own experience goes to show that these lesions occur in children the offspring of one or both parents in a tolerably active condition of syphilis, and in many of the reported cases the conditions were similar.

The orchitis begins slowly and insidiously. No pain is felt by the child, and attention is not called to the diseased organ until its dimensions have become so marked as to attract the notice of the mother or nurse. As usually seen in practice the testis is of the size of a pigeon's egg, of a small marble, of a shelled filbert, of an olive, or even of a walnut, but it is usually of an ovoid shape. As a rule, the organ is not large, and in the majority of cases reported it was of the size of a shelled or of an unbroken filbert. In other words, there is no tendency to the development of conspicuously large tumors. To the touch the swelled testis is hard and firm (less hard and ligneous than in the adult), indolent, painless, and decidedly heavy. It can usually be handled with impunity. In some cases there is concomitant hyperæmia of the scrotum. In rather rare instances the surface of the tunica albuginea is uneven and irregular, and the sensation as if small shot or split peas were seated in its superficies is conveyed to the touch.

The epididymis may be slightly or considerably enlarged in part or in whole. The swelling is smooth and firm, and pressure upon it sometimes causes pain. The enlargement of the vas is similar in all respects to that of the epididymis. The fact of the coincident involvement of the epididymis has been clearly brought out microscopically and clinically in an admirable paper by Carpenter.<sup>2</sup>

As a general rule, the enlargement of the epididymis or vas is an accompaniment of a testicular lesion. Comby,<sup>3</sup> however, reports the case of a child six weeks old, the subject of hereditary syphilis, in whom the epididymis was especially involved. This would seem to show that the epididymis alone may be attacked.

These affections, uninfluenced by treatment, usually run an uneventful course, and may end in resolution or in atrophy, particularly of the gland-substance. This was well shown in my second case, in which the testis was reduced to a small mass of fibrous tissue. Lewin<sup>4</sup> reports, as an instance of atrophy of the testes from hereditary syphilis, the case of a lad eighteen years old whose testicles were the size of a child; he was puerile in demeanor and looked like a boy of fourteen. Reclus<sup>5</sup> speaks of a case of a patient (age not stated), considered by Parrot and Fournier to be the victim of hereditary syphilis, in whom a gland of the size of a small nut and of great firmness was present. Facts therefore warrant the statement that hereditary syphilis, like traumatism, mumps, and varicocele, may lead to atrophy of the testes. As a general rule, it may be stated that atrophy is the chief form of degeneration in this form of orchitis. In somewhat rare instances fungus of the testes is observed, and it follows the same chronic, rebellious course that it does in the adult. Abscess and necrosis of the testes also occur, in which case we observe a

<sup>1</sup> *Op. cit.*, p. 435.

<sup>2</sup> "Affections of the Testicle in Hereditary Syphilis," *The Practitioner*, Sept., 1892, pp. 201 et seq.

<sup>3</sup> *Annales de Derm. et de Syphil.*, vol. x., 1889, p. 706.

<sup>4</sup> "Ueber Syphilis hereditaria, etc.," *Berl. klin. Wochens.*, Nos. 2 and 3, 1876.

<sup>5</sup> *De la Syphilis du Testicule*, Paris, 1882, pp. 149 et seq.



sinus in the scrotum (which may be much inflamed) which leads down to a pus-cavity of varying size in the gland itself. I once saw in consultation a case of this kind which was cured by careful treatment. If treated early and vigorously, resolution may be brought about and a testis more or less damaged may be left. It is always well to try energetic local and general treatment before thinking of ablation.

Hydrocele is a more frequent complication than has heretofore been conceded. It may be slight or well marked. Its existence in the infant should always excite interest, and its origin in syphilis or tuberculosis be established.

Carpenter reports three cases of hereditary syphilis in which there was hydrocele of the cord, but no appreciable testicular lesion. This affection of the cord might be a coincident, but Carpenter says "there is just a probability that hydrocele of the cord may in some instances owe its origin to congenital syphilis."

The concomitants of these testicular affections vary according to the age of the child and the intensity of the infection. In very early months roseola, papular syphilides, mucous patches, eye, ear, and bone lesions may be also present. In later months there will be fewer and perhaps no concomitants. But there may be bone or joint lesions, and perhaps cutaneous or mucous lesions in sparse and limited development.

**Diagnosis.**—As a rule, an intelligent study of a case of testicular lesion in a young child will lead to a correct diagnosis. It is necessary to obtain the history of both father and mother if possible, and then that of the child. In the early months of hereditary syphilis it may quite generally be possible to gain a knowledge or observe a vestige or sequela of some characteristic lesion or to see some lesion itself. In this event the diagnosis will be easy. When, however, for any cause we can obtain no information concerning the father or mother, and the child is free from all syphilitic lesions or their traces, difficulty is experienced. Then we must consider the character of the tumor, and see whether it conforms to the description already given. Deschamps,<sup>1</sup> as well as Hutinel, lays stress on the fact that in syphilis the testes are usually both involved, while in tuberculosis commonly but one is affected. This, however, cannot be accepted as a general rule, since we not uncommonly find that the syphilitic affection is unilateral. Then, again, too much stress cannot be laid upon the condition of the epididymis and vas. In syphilis these appendages may be moderately involved in whole or in part; in tuberculosis it is common to find them much enlarged and sometimes nodulated. When, therefore, we see a case in which there is a unilateral swelling, very marked enlargement of the epididymis, and perhaps of the vas, particularly if the enlargement is rugose or nodulated, and when the testicular lesion is less developed, we may suspect syphilis. In all such cases it is absolutely necessary to examine the prostate and seminal vesicles by rectal touch, and if they also are found to be swollen, the presumption will be warranted that the case is one of tuberculosis. On the other hand, freedom of these structures from diseases points in a measure to the existence of syphilis.

No absolute criterion can be drawn from the conditions attending the

<sup>1</sup> "Tuberculose du Testicule chez les Enfants," *Arch. gén. de Méd.*, 1891, vol. i. pp. 257 et seq.

invasion of the disease. In syphilis the enlargement as a rule takes place slowly, but sometimes rather rapidly. In tuberculosis the invasion may be slow and insidious also. But it is well to remember, as Jullien<sup>1</sup> has shown in his admirable article, that the most common mode of invasion is the brusque and rapid, attended with marked inflammatory symptoms. This is rarely, if ever, seen in syphilis.

While, therefore, in most cases a clear diagnosis may be made, instances will occur in which it is impossible to say whether the lesion is syphilitic or tuberculous. This point has been prominently brought out by Hutinel and Deschamps, and also by Carpenter and Colcott Fox. These observers report cases in which the syphilitic history is clear and the testicular symptoms point to that origin, yet intelligent and active antisyphilitic treatment fails to produce resolution. In these cases we observe what is so frequently seen in adults—namely, a tubercular infection in a syphilitic subject. This is common in many organs and tissues, notably the lungs, bones, joints, meninges, and testes. It is always well, therefore, to remember this frequently occurring mixed infection. Carpenter very properly states that a thickened, indurated, and enlarged vas is strongly indicative of tuberculosis. The same may be said of cases in which there are multiple ulcerations and adhesions of the scrotum to the testicles.

It is well to remember that the testes of young children are sometimes the seat of carcinoma, encephaloid cancer, and sarcoma. These malignant growths are usually seen toward the end of the first year of life and later. They are, as a rule, of rapid development, of large size (that of a hen's egg, a mandarin, and larger), may be accompanied by inguinal adenopathy and usually more or less pain, and always lead to death, sooner or later.

*Pathological Anatomy.*—The histology of the diseased testicle in hereditary syphilis has been studied by Parrot, Hutinel, Reclus, and Carpenter. The lesion is an interstitial and diffuse collection of round embryonic cells resembling white blood-cells. In the interstitial form, in which the gland may not be perceptibly enlarged, the cell-growth results in small tumors of various sizes irregularly placed around the arterioles which traverse the trabeculæ. In other words, it is the same coat-sleeve infiltration which we see in the adult. In the diffuse form, in which the organ is much enlarged, a smaller cell-growth is found permeating the meshes of its connective tissue generally. The process begins at the mediastinum testis, follows the vessels of the trabeculæ between the seminiferous tubules, and finally results in hypertrophy and sclerosis of the organ, with partial or entire obliteration of the tubules, whose lining epithelium undergoes granulo-fatty degeneration. Fatty degeneration

<sup>1</sup> "De la Tuberculose Testiculaire chez les Enfants," *Archiv. gen. de Méd.*, April, 1890. It may be interesting to note that in 20 of Jullien's cases "16 occurred in children of less than five years of age, 6 of them were less than one year old, and 6 ranged from one to two years. Of the former, 1 was one month old, and 2 were two months old when the disease was detected. Giralde's (*Leçons cliniques sur les Maladies chirurgicales des Enfants*, 1869, p. 524) has recorded the cases of infants of a few days only, and Dreschfeld (*British Medical Journal*, 1884, p. 860) has observed a case of congenital tuberculosis of the testicle. In four observations by M. Lannois (*Revue mensuelle des Malad. de l'Enfance*, 1883, p. 528) the testicular tuberculosis appeared at five months, six months, seven months, and thirteen months of age." (Quoted from Carpenter, *op. cit.*)

and final absorption of the new growth takes place, resulting in atrophy and, in rare cases, in complete destruction of the organ. Probably, the cases which are attributed to arrest of development, in which the testis is small or entirely absent, are those in which the organ has been attacked in early life by hereditary syphilis. It is probable that the ovaries may be affected in a similar manner to the testicles.

Gummata of the testicle in the hereditarily syphilitic infant are very rare. Hutchinson<sup>1</sup> showed at the meeting of the London Pathological Society a specimen of gumma of the testis from a boy the subject of hereditary syphilis. The testis was much enlarged and thoroughly infiltrated with a growth of opaque yellow color. Henoch<sup>2</sup> examined after death this testes of an hereditarily syphilitic boy and found extensive connective-tissue hypertrophy of the corpus Highmori. Carpenter also found interstitial new growth in the epididymis. I have failed to find mention of other similar cases.

*Treatment.*—My experience in fifteen cases convinced me that the mixed treatment in goodly and increasing doses was most efficient in these testicular lesions, as it is in the bone-and-joint lesions of hereditary syphilis. I was often much surprised at the large doses which infants could take with impunity and marked benefit. This treatment, with intermissions, should be kept up at least two or three years. I am not in accord with Carpenter and other English authors who pin their faith on gray powder. This drug may be useful in the exanthematous stage or state of hereditary syphilis, but it has in my hands proved very feeble and often inert in the lesions of the fibrous tissues and bones.

Locally much good can be derived from mercurial frictions to the scrotum, using, with great care as to the avoidance of dermatitis, white precipitate or blue ointment.

When the organ is much destroyed by degenerative processes ablation may be necessary.

### **Affections of the Synovial Sheaths.**

In two cases of hereditary syphilis under my observation the extensor tendons of the hands were involved, as indicated by marked fusiform swelling over the metacarpal bones, of doughy consistence, and freely movable under the skin, which was slightly distended and reddened. Its development was rapid and associated with other lesions, particularly osseous, its subsequent course indolent and not appreciably affected by mercurial treatment. In one case cure resulted from the application of a compress over a piece of mercurial plaster after withdrawal of the fluid with the hypodermic needle. Other tendinous sheaths than those of the hands may be affected.

### **Affections of the Nails—Onychia.**

The nails are not as frequently involved in hereditary as in acquired syphilis. There are two varieties of onychia; the ulcerative, which is the more frequent, and the non-ulcerative.

<sup>1</sup> Transactions, London, vol. xxxi. p. 192.

<sup>2</sup> "Ueber Syphilis der Hoden bei kleineren Kindern," *Deutsch. Zeitschrift. f. pract. Med.*, 1877, No. 2.



Ulcerative onychia begins at the side or base of the nail as a papule or pustule, which soon ulcerates, the process extending along the concave base of the nail, being limited indefinitely to that location, or along the lateral margins and finally involving the matrix of the nail, which in the latter case is soon cast off. The distal phalanx becomes very painful and enlarged, the finger resembling in shape an Indian-club. The thickened everted edges of the ulcer, its sloughy base and sanious discharge, and the coppery hue of the surrounding skin are characteristic.

This form of onychia may be met with alone or associated with general papular or ulcerative eruptions, and is most frequently seen during the first year or two of the child's disease. In cases improperly treated it may be developed later, and, though its course is generally chronic, it may be decidedly shortened by appropriate treatment. The nails of the hands seem to be more often affected than those of the feet.

The growth of a deformed and useless nail or cicatrization without a new nail may be expected in severe and protracted cases not subjected to treatment. In such cases osteitis of the phalanx may indicate amputation. The second form of onychia is even more chronic than the preceding, and a much later manifestation of the disease. It begins as a swelling of a coppery hue at the base or around the margins of the nail, which shades off into the surrounding parts. At the same time the nail loses its smoothness and gloss and becomes thickened, fissured, and brittle. The nail has a dirty-white color, and there is always hyperæmia of the matrix and the surrounding parts, with much deformity of the phalanx, which may not be permanent. The nail may be finally restored in a perfectly healthy condition, and the bone is usually not involved.

### Affections of the Hair.

The features of alopecia in hereditary syphilis are similar to those of the shedding form in the acquired disease. It occurs also in connection with dermal lesions of the scalp, particularly pustular. In other cases a dry condition of the hair seems to be a result of the adynamic influence of syphilis, rather than any specific process.

### Affection of the Thymus Gland.

Paul Dubois<sup>1</sup> in 1850 first called attention to certain pathological changes which are found in the thymus gland of infants who are born dead or who die a few days after birth from inherited syphilis. Externally, the gland appears to be normal in size, color, and consistency; but if an incision be made into its substance, pressure will cause to exude from the cut surface a few drops of yellowish fluid, which under the microscope is found to consist of pus. In the cases observed by Dubois the purulent matter was uniformly diffused throughout the glandular tissue, but Depaul,<sup>2</sup> Weber,<sup>3</sup> and Hecker,<sup>4</sup> have met with abscesses of the thymus. The thymus gland naturally contains a whitish, viscid fluid, which may with a little care be distinguished from

<sup>1</sup> *Gaz. méd. de Paris*, 1850, p. 392.

<sup>2</sup> *Bulletin de la Société d'Anatomie de Paris*, xxix., 1854, p. 47.

<sup>3</sup> *Beitr. zur path. Anat. d. Neugeborenen*, Kiel, 1852, ii. p. 75.

<sup>4</sup> *Verandl. d. Gesellsch. f. Geburtsh.*, in *Berl.*, viii. p. 117.

the suppuration dependent upon syphilis. Of five cases of this lesion observed by Dubois and Depaul, an eruption of pemphigus was present in four, and in the same number the syphilitic antecedents of the parents were clearly established.

The more recent observations of Weisflog<sup>1</sup> and Widerhofer<sup>2</sup> have confirmed the views of Dubois, which were at one time rejected by several German authors, who claimed that Dubois had mistaken the normal secretion of the gland for pus, and that the possible changes were not necessarily due to hereditary syphilis. Having studied the literature of the subject; as well as the lesion itself, Weisflog arrives at the following conclusions: 1. It is certain that the thymus abscess described by Dubois exists, and, although not a constant symptom of hereditary syphilis, it is sometimes met with. 2. This lesion, associated with other signs of congenital syphilis, indicates that the father or mother of the infant suffers or has suffered from syphilis. 3. It is possible, but not proved, that this affection may exist in children in whom there are no symptoms of syphilis, but its existence renders the diagnosis of hereditary syphilis probable even if the disease of the parents is not proved. 4. Such is the great similarity in the appearance of pus and of the secretion of the thymus that they cannot always be distinguished.

### Lesions of the Umbilical Vein.

Oedmansson and Winckel found stenosis of the umbilical vein in the cord of certain macerated fœtuses whose death was attributed to syphilis. The former thought that it was caused by the atheromatous process. Birch-Hirschfeld, who has also observed this condition, thinks that it is due to changes similar to those occurring in the arteries of the brain, as described by Heubner. Should future investigation confirm the view of Hirschfeld, this lesion of the umbilical vein must be considered an important element in causing the death of the syphilitic embryo.

Microbic invasion of the umbilical cord may occur, and as a result septicæmia may be produced.

### Hemorrhagic Syphilis.

Hemorrhagic syphilis in infected infants is sometimes seen in the form of large and small petechiæ and ecchymoses. It may occur into the skin and mucous membranes, and also into the viscera and from the umbilical vein. Mracek<sup>3</sup> observed 19 cases, in 18 of which the infants were born alive. In most there were visceral hemorrhages. In many cases of hemorrhage a fatal termination may be expected. Cases of hemorrhage in newly born syphilitic children have been reported by Petersen<sup>4</sup> in an essay in which he treats of this subject.

<sup>1</sup> "Ein Beitrag zur Kenntniss der Dubois'schen Thymus Abscesse bei angeborener Syphilis," *Inaug. Dissertation*, Zürich, 1860.

<sup>2</sup> "Ueber Thymus Abscesse bei hereditärer Syphilis," *säparat-abdruck aus dem J. d. Kinderheilk*, Wien, 1852.

<sup>3</sup> *Deut. med. Zeitschr.*, No. 82, 1886.

<sup>4</sup> *Vierteljahr. für Derm. und Syph.*, 1883, pp. 509 et seq.

## MICRO-ORGANISMS IN HEREDITARILY SYPHILITIC CHILDREN.

Observations made by Kassowitz and Hochsinger<sup>1</sup> and by Doutrelepon<sup>2</sup> show that the tissues of syphilitic infants contain many micro-organisms. In several cases of infants who died a few days after birth the last-named observer found streptococci and staphylococci in the skin above the Malpighian layer, in the vessels, and lymphatics. He thinks that these microbes penetrate the skin and mucous membranes through lesions of continuity produced by the infection. Kassowitz and Hochsinger found a chain-coccus in the blood, bones, and viscera of syphilitic infants, but not in non-syphilitics. Chotzen<sup>3</sup> has studied this subject carefully, and concludes that in some cases the microbes enter the system through the nasal mucous membrane, which is in an inflamed condition. They are then carried by the circulation to all parts of the body. In this manner septicæmia may be produced.

## Affections of the Lymphatic Ganglia.

General subacute adenitis, invariably present in the early stages of the acquired, is always absent in hereditary syphilis, and is an important feature in the differential diagnosis. Swelling of the cervical ganglia, which often accompanies active lesions in the mouth and throat and upon the scalp, frequently results in abscess, particularly in cachectic children, when the condition can be distinguished from tuberculosis only by the history of the case and by concomitant symptoms.

On post-mortem examination Hutchinson found the bronchial ganglia of a syphilitic child, five months old, infiltrated with fibrinous deposits, and cases of infiltration of cell-elements, sometimes in the form of small circumscribed tumors, have been reported by Bärensprung. The ganglia of the gastro-hepatic omentum and mesentery were found most frequently involved, being symptomatic perhaps of visceral lesions.

## Affections of the Bones.

Until within twenty years the majority of bone lesions in children were attributed to rickets or scrofula. In 1870 an important contribution to this subject was published by Wegner<sup>4</sup> of Berlin, in which he described certain changes found at the junctions of the diaphyses and epiphyses of the long bones of infants with hereditary syphilis. Two years later Waldeyer and Köbner<sup>5</sup> published a paper in which they confirmed Wegner's discovery, although they differed with him in their interpretation of the pathological appearances. Following these German observers, Parrot<sup>6</sup> of Paris published in 1872 an elaborate paper, in which he gave many histological facts and brought out one important

<sup>1</sup> *Wiener Med. Blätter*, Nos. 1, 2, and 3, 1886.

<sup>2</sup> *Centralblatt für Bakteriologie und Parasitenkunde*, No. 13, 1887.

<sup>3</sup> *Archiv für Derm. und Syphilis*, vol. xix., 1887, pp. 108 et seq.

<sup>4</sup> "Ueber hereditäre Knozensyphilis bei jungen Kindern," *Arch. f. path. Anat., etc.*, l., 1870.

<sup>5</sup> "Beiträge zur Kenntniss der hereditären Knozensyphilis," *Arch. f. path. Anat., etc.*, lv., 1872.

<sup>6</sup> *Arch. de Physiol. norm. et path.*, Paris, 4 année, 1872.



symptom of these affections. In 1875, I published a work containing a full description of these affections, their pathology, and a *résumé* of previous contributions concerning them.<sup>1</sup>

The bones are affected in various ways by hereditary syphilis. In the early months of infancy the morbid change is peculiarly frequent in long bones at the junction of the epiphysis with the diaphysis. In the first years of hereditary syphilis the small bones of the fingers and toes are also quite frequently affected, while later on a tendency to invasion of the shafts of long bones and of the surfaces of flat ones is noticed. We shall therefore describe the diaphyso-epiphysal lesion under the name *osteochondritis syphilitica*, and the affection of the long bones under *periostitis*. The lesions of the bones of the fingers and toes are somewhat peculiar and require a separate description.

**OSTEOCHONDRITIS.**—This affection is claimed to be one of the most constant manifestations of hereditary syphilis. It is often the only one, and frequently its presence decides the syphilitic nature of coexisting lesions. A knowledge of the fact that this affection is exclusively caused by syphilis has been of great service in the study of hereditary syphilis.

If we remember that the growth of the bone in length takes place at the extremity of the shaft, where the epiphysis is joined to it by a layer of cartilage, and that here syphilitic changes are most often found, we shall see how the normal development of the bone may be greatly perverted or interfered with.

The bones most commonly attacked are those of the forearm, the leg, the arm, and the thigh. The clavicle, sternum, and ribs are also attacked, as well as the metacarpal and metatarsal bones. The number of bones involved varies. It has been noticed that in stillborn infants and in those dying soon after birth the majority or even all of the long bones are affected. It is very exceptional for the victims of multiple bone lesions to survive, and it is fair to assume that the number of bones attacked varies with the intensity of the syphilitic diathesis.

In these cases of osteochondritis we find at the diaphyso-epiphysal junction a swelling, which may be visible, but in fat children is often imperceptible. On palpation the bone is found to be encircled by an abruptly limited collar or ring, which usually extends completely around. In some cases the entire epiphysis may be expanded, with or without a distinct ring, at its junction with the shaft. The surface of these swellings and rings is generally smooth; it may be slightly irregular, but is seldom very much ridged. When two contiguous bones are affected they often seem to be fused together. In living children the distal more often than the proximal extremities have been found affected, and the affection is generally symmetrical, especially in very young subjects. In some cases, particularly at the lower end of the humerus and at the upper end of the tibia, the lesion does not surround the bone, but is limited to the segment of the diaphyso-epiphysal junction.

The swellings on the clavicle are usually found at its sternal end,

<sup>1</sup> *Syphilitic Lesions of the Osseous System in Infants and Young Children*, New York, 1875.

and are sometimes of large size. Those of the sternum are not common in very young children; lesions of the ribs, which occur at their junction with the costal cartilages, are also infrequent, and are generally not as numerous or symmetrical as those of rickets.

These swellings may be developed slowly or quite rapidly. After reaching their full size they usually remain in an indolent condition, causing little if any pain, and interfering but slightly with the motion of the joint. Under appropriate treatment they promptly subside. The integument undergoes very little if any change, and becomes tense and thin only when the tumors are exceptionally large. The joints may be secondarily involved and become the seat of subacute synovitis, the effusion being slight or extreme. Those most commonly attacked are the elbow and knee; as a rule, the joints with short epiphyses are most liable to hyperæmia and effusion. Pressure, accompanied by internal treatment, speedily disperses the joint swellings, which usually give rise to but slight inconvenience.

Degenerative changes sometimes take place in these osseous lesions. In their mildest form they consist simply of a superficial breaking-down at one part of the swelling. We first observe fluctuation, soon followed by ulceration of the skin, resembling in appearance that which occurs in gummy tumors. These necrotic changes, however, may be much more active and extensive in the bone than in the cutaneous ulcer, which shows very little tendency to increase in size. The epiphysis may be entirely separated from the shaft, and if the superficial ulcer is large, it may be extruded. In most cases where the destructive process is extensive the syphilitic diathesis is intense, and a fatal termination ensues. In others, however, reparative changes of an interesting and peculiar character occur.

The intervening cartilage having been destroyed, the diaphysis is united to the shaft only by fibres of periosteum. This membrane becomes much thickened and forms a more or less complete cylinder, uniting the two fragments with considerable firmness. Bony spiculæ shoot from its inner surface between the two osseous surfaces, and eventually bony union is formed. The periosteum continues thickened for a long time, but gradually resumes its normal proportions as the union between the bones grows firmer.

The effect of these swellings upon the ultimate shape of the bone depends on the intensity of the morbid process. When resolution takes place the nutrition of the bone is afterward fully restored, but in case of destruction of the intermediate layer of cartilage the bone is usually shortened. These lesions are usually found at birth or within the first month of life. They may appear later, even as late as the twelfth year, when they are developed very slowly, are few in number, and are unsymmetrical. The occurrence of ossification between the segments of a bone no doubt has much influence upon the development of the lesions; we may therefore expect to see them at the time when bony union occurs. Identical changes have been observed in children with acquired syphilis, but the affection in such cases was limited to a few bones or even to one.

This affection results from interference with the nutrition of the bone, and presents three stages. In the first the intermediate layer of car-

tilage is thickened, uneven, and irregular, and under the microscope we find simple increase of the cartilage-cells. In the second stage the cartilage is still thicker, and is nodulated on its epiphyseal surface, and warty or papilliform processes of calcified cartilage project into the hyaline matrix. Wegner compares them with the papillæ of the cutis on account of their broad bases and tapering ends. Deposits of lime are also found in the hyaline matrix between these projections. On the periphery the infiltration encroaches farther into the cartilage than at its centre. We find when examining the relations of this calcified line to the spongy bone that there are corresponding depressions into which the spongy tissue passes. Under the microscope we find the longitudinal rows of cartilage more abundant than in the first stage, and there is very little intercellular substance. The vessels are numerous, and at the line of ossification are surrounded by a considerable quantity of connective tissue. The walls of the cavities are broader at their bases and are sclerotic. In many places an osteoid substance is developed from the cartilage and from the medulla which enters with the vessels. This substance is found to be in some places true bone which passes into the spongoid layer. Beyond the *couche chondroïde* we find irregularly distributed spots of calcified cartilage forming a zone of considerable breadth. The principal points in the second stage, therefore, are greater proliferation of the cartilage cells, premature sclerosis of the intercellular substance, formation of bony projections beyond the normal layer, and delay in bone-formation elsewhere; in other words irregular osteogenesis, premature in some regions and retarded in others. In the third stage there is a general enlargement of the epiphyses, with thickening of the periosteum and perichondrium. Under the microscope the following conditions are seen: The lowermost layer of hyaline cartilage is bluish and transparent; this layer is succeeded by an irregular and wavy layer with serrated processes and having a grayish-white color and of homogeneous formation. This layer is brittle and can be readily removed. Next to this is placed a layer of grayish-red or yellow substance, soft and sometimes viscid, which is gradually lost in the spongy substance of the diaphysis. The medullary tissue of the latter continues for some distance, and, instead of being normally red, is gray or grayish-red. This layer seems to destroy the firm cohesion of the epiphysis to the shaft. In this stage the proliferation of cartilage-cells and the lime-infiltration is excessive. In the layer next to the bone we see nucleated cells, spindle-shaped cells, and granular detritus. Waldeyer and Köbner consider this to be granulation tissue growing into the cartilage from the medulla. Wegner, on the contrary, denies that it is true granulation tissue.

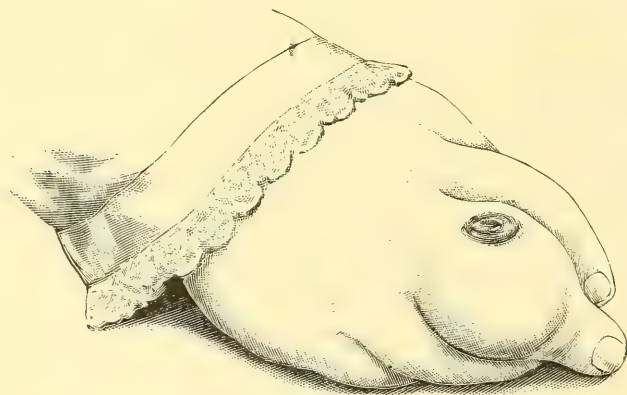
**PERIOSTITIS.**—While osteochondritis occurs in early infancy, periostitis is a later affection, attacking the bones of syphilitic children who have already begun to walk. Whether the active use of the bones has any influence in developing periosteal inflammation we cannot say positively, although its occurrence in the bones of the leg render this view probable. In the majority of cases the femur and tibia are first attacked, sometimes as early as the second year, but generally at the fourth or fifth. When long bones are involved thus early the greater part of the shaft usually suffers. The bone becomes very tender, and soon is seen to be



much enlarged, even to twice or thrice its normal thickness. It seems bent anteriorly, producing marked deformity. The fibula is also sometimes affected, and generally both legs are attacked. The bones of the forearm are, next to the tibia, most prone to this disease. The earlier it appears, the more likely is the affection to involve both limbs symmetrically; at later periods it may be unilateral and more localized, perhaps forming circumscribed nodes. The skull-bones are sometimes the seat of these nodes, which are apt to be quite large and multiple. In very severe cases they sometimes break down and form troublesome abscesses. Although periostitis usually occurs before the twelfth year, I have seen it as late as the fifteenth and even nineteenth year.

**DACTYLITIS SYPHILITICA.**—In the early months of hereditary syphilis children are often attacked by swelling of the phalanges and the metacarpal and metatarsal bones. These lesions are of the same character as those of acquired syphilis. The proximal phalanges are most often attacked, and the distal least commonly; sometimes all three phalanges are involved at the same time. The bones may be enlarged greatly beyond their natural size, the deformity, of course, differing with the phalanx involved. One or more bones of one or of each hand may be involved; in one instance I have seen every phalanx of each hand swollen. Sometimes the metacarpal bones are enlarged; the lesion is less frequently seen in the toes and metatarsal bones. The swellings progress slowly or with surprising rapidity. In their early stages the integument is unchanged; at a later period the overlying parts become inflamed and an abscess is formed. The condition is well shown in Fig. 230.

FIG. 230.



Dactylitis syphilitica in the infant.

If uninfluenced by treatment, these swellings run a very chronic course, but when treated early they gradually subside. In some cases exsection of the bones is required, but generally the destructive changes are more extensive in the skin than in the bones. Apparently hopeless cases often yield to persevering internal and local treatment, without the necessity of an operation. At the termination of the disease the shape of the phalanx may be restored, or it may be lengthened, or even very much thinned and shortened.

Dactylitis is usually observed in very young children; it may also occur as late as the twentieth year. In the latter case it is usually preceded by other osseous and articular lesions.

**SWELLING OF THE METACARPAL AND METATARSAL BONES.**—These lesions usually occur quite early in hereditary syphilis, and may or may not coexist with dactylitic enlargements. They may appear even as late as the twentieth year. A single bone only is sometimes affected, but in one instance I have found all of the metacarpal and metatarsal bones involved. These swellings usually form rapidly and attain considerable size. They may or may not be attended by pain. In the early years of hereditary syphilis they commonly involve the entire bone; in later years the swellings are often circumscribed. They do not occur as early or as frequently as the dactylitic swellings, nor have I observed the necrotic tendency sometimes seen in swellings of the phalanges. When the tumors reach a large size the integument becomes tense, inflamed, and may ulcerate. Such cases are very protracted.

These lesions have different results in various cases and according to the age of the patient. In very young children the bones may be left in a normal condition; sometimes they are a little thinned or shortened. In later stages of hereditary syphilis we find destruction of a segment of the bone, which is thus divided into two parts, joined firmly by a band of fibrous tissue.

The **treatment** of all bone swellings should combine mercury with iodide of potassium.

### **Affections of the Nervous System.**

Until recently our knowledge of the affections of the nervous system caused by hereditary syphilis was very fragmentary and incomplete, which was due, beyond doubt, largely to the fact that nearly all affections of the brain in infants and young children had been for so long considered to be of tubercular origin that little attention had been paid to the influence of hereditary syphilis in their causation. Though the pathological facts which have been learned concerning the effect of this diathesis are far from complete, their suggestions are so comprehensive that their importance is greatly increased. This statement is borne out by the fact that we now positively know that in hereditary syphilis there have been found the results of meningeal inflammation, such as thickening and adhesion of the membranes by the development of fibrous tissue and gummy material, and that the endoarteritis so frequently found in the acquired form has also been observed in hereditary syphilis. Gummata on the membranes have also been found. This knowledge is most important and far-reaching, since it suggests strongly the probability that there may occur during the course of hereditary syphilis the same numerous and complex affections as are known to occur in the acquired form. As our present knowledge of the clinical history and of the pathology of the several hereditary affections is not complete, I can only give a general sketch of them. The observations of Jackson and others have conclusively shown that hereditarily syphilitic infants and young children are liable to chorea. This may be of a mild and ephemeral form, or it may be severe. In several cases it has coexisted with hemiplegia, and in others there has been superadded epilepsy. In such cases Jackson thinks that

the hemiplegia is caused by the plugging up of the middle cerebral artery, that the chorea is due to occlusion of its small distal branches, while the epilepsy is due either to thickening of the meninges or a gum-mous growth in or near the corpus striatum. The occurrence of epilepsy alone, without hemiplegia, is very frequently observed in hereditary syphilis, either within the years of infancy or later on in childhood. Indeed, its evolution has been observed as late as the twelfth or fifteenth year. So impressed is Jackson with the relation of hereditary syphilis to epilepsy that he says: "When a child is brought to us for an affection so painfully obscure as general epilepsy, it is well to examine the patient's brothers and sisters for signs of syphilis." We would add even more—that the child should be thoroughly examined to determine whether it is syphilitic. The eye must be examined superficially and deep. In such cases we often find evidences of antecedent keratitis, of choroiditis and retinitis; sometimes of optic neuritis. Then, again, we may find evidence in the notched state of the teeth, in certain small white linear scars at the angles of the mouth, in falling of the nose, and in a bow-shaped condition of the tibiae. All or some of these symptoms may be found also in cases of epileptic hemiplegia or of hemiplegia alone. Though palsies of the cranial nerves do not occur as frequently in hereditary as in acquired syphilis, the observations of Barlow and Dowse have positively proved that several of them may be attacked by syphilis. One of the most suggestive cases published is that of Barlow, of an hereditary syphilitic child four months old who presented well-marked lesions which were improved by mercury. Then she began to run down, had carpopedal contractions, was attacked by convulsions, and died. At the autopsy the membranes were found to be slightly thickened, and at the base of the optic commissure was a small patch of greenish lymph, while the fissures of Sylvius were glued by old exudation. In many places on the vertex and on the inferior surface of the temporo-sphenoidal lobes there was thickening of the membrane from fibrous tissue, while on the upper surface of the left parietal lobe was a thin patch of calcification. The small vessels of the cortex were markedly altered; being at first natural, they became of a dirty-white color, without dilatation or narrowing, and looked like threads. There was no granulation of the pia mater, as in tubercle. There were also a few patches of superficial softening. The choroid and retina were infiltrated in a circumscribed manner by corpuscles as large as those of pus. The most important point found by Barlow was in the thickened membranes, which contained an excess of fibrous tissues with cells, not mere nuclei, but well-formed lymphoid cells, each containing a nucleus and sometimes a nucleolus. These seemed to have no arrangement around the vessels, and retained their individuality, with no massing into heaps and central degeneration, thus differing from tubercle. In the vessels there was a new growth of the inner coat, which narrowed and even occluded their calibre.

The affections of the nervous system of hereditary syphilis resemble in their evolution and course those of the acquired disease in the complex and disorderly association of symptoms and in the frequent coexistence of eye affections, such as optic neuritis and paralyses of one or more cranial nerves. In the hereditary form the ocular lesions are, in general, more complex and numerous than in the acquired form.



**Treatment of Hereditary Syphilis.**—Though the treatment of hereditary syphilis is very similar in many particulars to that of the acquired disease, it presents many divergencies and difficulties, and is not followed by such uniformly good results as are obtained in adults. Children born syphilitic are in various degrees tainted through and through with the poison, consequently the physician is at the outset brought face to face with malnutrition and a tendency to decay. He really has little, if anything, to build upon. In this fact lies the great difficulty in treating the victims of hereditary syphilis, and to it largely are due the many failures of our therapeutics. In acquired syphilis, as a rule, the evolution is tolerably orderly, and the lesions as they appear give indications which guide us in their cure. In hereditary syphilis, however, there is no order, and many of its manifestations are wrapped in obscurity and doubt. Thus it may be that we find bone and articular lesions present, with those of an exanthematic character seated on the skin. In some cases no skin lesions are present, while affections of the mucous membrane may exist, and then be in a doubtful and masked form. In other cases the evolution of lesions and various affections is early and prompt, and their general physiognomy may point to their nature. Then, again, in lesions equally precocious there may be no decided features. Consequently, doubt and uncertainty as to their simple or specific nature may exist. This remark applies to ill-defined early eruptions and to affections of the mouth and nose, which, though caused by syphilis, resemble simple affections.

Further, the evolution of hereditary manifestations may be much delayed, so that the suspicion of their specificity is forgotten or not entertained. Thus we may see delayed cutaneous and mucous eruptions which are atypical and cause much perplexity of mind.

As a rule, the treatment of acquired syphilis is progressively orderly, while that of the hereditary disease is very often begun in doubt and uncertainty, and throughout its course subject to all manner of changes and modifications. A condition requiring mercury to-day may be replaced by the necessity to use iodide of potassium within a week, and *vice versâ*. Consequently, no specific data can be laid down for a general methodical treatment of hereditary syphilis. It is incumbent, therefore, upon the physician to watch his case continuously, and always to be ready with such measures of relief as may be indicated by the existing lesions.

It must be clearly understood by the physician, and as clearly presented to the parents or guardian, that, as a rule, at least one year and more—generally two—are necessary for the treatment of a syphilitic infant. The disappearance of one crop of manifestations merely means that one stage of the disease has been auspiciously passed over. We must then keep on in order to prevent or attenuate the severity of later outbursts. It is always well, however, to temper the activity of treatment by proper intermissions.

We will first consider the question of the treatment of the pregnant syphilitic mother; then the expediency of treating the child through the medium of a medicated mother or nurse; and then we shall come to the subject proper—namely, the treatment of hereditary syphilis in its various forms.

*The Treatment of the Pregnant Syphilitic Mother and its Effect on the Fœtus.*—An important question in the therapeutics of hereditary syphilis is the management of the case of the pregnant mother. On this subject the views of the profession are far from being clear and sharply formulated, and while we find some who recommend that the mother should be treated on her own account and also as a prophylactic measure for her offspring, others are in a state of doubt as to the wisdom and probable beneficial outcome of such a course, having an ill-defined fear that harm may thereby come to both. It is necessary, therefore, that this question should be studied in the light of the accumulated knowledge of to-day.

When it is possible the physician should endeavor to prevent the marriage of a syphilitic, male or female, until he or she shall have had a well-regulated general methodical treatment for at least two or two and a half years. At the end of that time, if their condition warrants it, they may marry. Some authors plead for a longer period of time, but I am fully convinced that in favorable cases treatment followed on the lines indicated will fit patients to marry and to produce healthy offspring. I have seen scores of infants born under these circumstances who have been healthy and strong. In very many cases, however, syphilitics will marry in spite of the physician's remonstrance, and a vast number marry who either do not know or do not realize the gravity and danger of their position. So that whatever the profession may do in trying to prevent the procreation of syphilitic children, these weakly and miserable specimens of humanity will come into the world, and their treatment during their gestation and after birth will be a source of solicitude and a tax upon the therapeutic resources of the medical profession.

In this connection it is well to consider what is the effect of hereditary syphilis upon its victims. See page 920.

The death-rate is so great that the resources of the medical art certainly should be taxed to the utmost to reduce it.

Before proceeding to the question of the treatment of syphilitic mothers, it is important to consider the part of the father as a factor in the causation of hereditary syphilis. It is now well known that men in the grasp of active syphilis very frequently procreate infected children whose mothers, unless infected by some active lesion, may remain free from the disease. Therefore it is the duty of the physician to explain to a syphilitic father that his disease is liable to infect his offspring, and to urge him to avail himself of all possible measures to rid himself of it.

The necessity of treating a syphilitic mother being therefore so obvious, the question arises, Can we treat such a mother without danger to herself, and will that treatment be beneficial to her and to her offspring? So many facts have been accumulated by so many observers in medical literature—notably, Massa, Garnier, De Blégnny, Astruc, Petit, Fabre, Levret, Rosen, Underwood, Swediaur, Bell, Bertin, S. Cooper, Lagneau, Gibert, Cazenave, Cullerier, and Ricord—as to the wisdom and benefit to be derived both by mother and child from a well-ordered antisymphilitic course of treatment during pregnancy that I will answer the question and its subdivision emphatically in the affirmative. I know of no condition in the course of syphilis which more urgently demands an active and

energetic but careful, watchful, and conservative treatment than does pregnancy in a syphilitic woman. Huguier and others thought that mercurial treatment predisposes a woman to more serious danger in abortion than if a simple treatment had been followed. Indeed, the idea was and is prevalent that mercury will produce abortion in pregnant women. If carelessly and unsparingly used, it may undoubtedly produce abortion and imperil a woman's life. But if the treatment is followed on the lines indicated in this chapter, no harm will be done and infinite good will certainly result. I am fully in accord with Sigmund,<sup>1</sup> who says that there is not the slightest danger to the mother or child by the use of a careful inunction treatment. By this means he has seen (and I can confirm his statement) living and healthy children brought into the world. As corroborative evidence I may here give Ricord's views, which, though old, are very apposite. He says: "The period of gestation in women, far from contraindicating energetic treatment, demands increased attention and promptitude within the bounds of prudence. I have seen very many more abortions among syphilitic women who had not been treated than among those who, taken in time, had been subjected to methodical medication."

A question so vitally important as the present one should be treated in the light of accomplished facts, and something more than mere statements should be offered. It is interesting, therefore, to know that the effect of mercurial treatment upon the pregnant syphilitic woman has been carefully and extensively studied under Sigmund's guidance and in his wards by Löwy<sup>2</sup> and Fonberg.<sup>3</sup> Löwy's observations go to show that by treating pregnant syphilitic women by inunctions abortion was reduced to 13.5 per cent., while in those not treated the ratio was 29.5 per cent. After inunctions there were 75 per cent. of living children. His observations further prove that the treatment exerts no bad influence over the life of the mother and of the foetus, and that it does not cause abortion or premature labor, and further, that it lessens the severity of the disease in both. In like manner, Fonberg found that the inunction treatment reduced the number of abortions from 28.5 to 14 per cent. He very wisely adds that a too energetic treatment may be injurious to mother and child.

Clinical observation has the support of a fact derived from careful chemical analysis. Cathelineau,<sup>4</sup> at Fournier's suggestion, made a careful analysis of the viscera of a foetus whose mother was treated by inunctions. He found unmistakable evidence of mercury in the liver, heart, kidneys, and other organs as well as in the amniotic fluid.

These conclusions, the outcome of careful and extended observation and study, supported by the testimony of the observers mentioned, certainly should be accepted, and this beneficent medication should be administered to the pregnant woman.

<sup>1</sup> *Op. cit.*, 1878, p. 103 et seq.

<sup>2</sup> "Beobachtungen an einen Reihe von Syphilitischen Schwangeren welche der Einreibungsur unterzogen Werden," *Wiener med. Wochenschrift*, No. 39, 1869.

<sup>3</sup> "Einige statische Daten ueber Syphilis der Schwangeren mit Rücksicht auf Heredität und Behandlung," *ibid.*, Nos. 49-51, 1872.

<sup>4</sup> "Passage du Mercure de la Mère au Fœtus dans le Traitement antisypilitique fait pendant la Grossesse," *Bulletin de la Société Française de Derm. et de Syph.*, 1890, vol. i. pp. 167 et seq.



Pregnancy, therefore, is an exigency in which, as shown on p. 824, the very early administration of antisymphilitic treatment is indicated. The management of syphilis in the pregnant woman requires of the physician skill, care, and watchfulness. As soon as the chancre is diagnosticated it should be treated carefully and efficiently. Lesions of any kind on the genitals of the pregnant woman indicate the necessity for great cleanliness. This is especially necessary when chancre is present. Therefore frequent mild antiseptic injections and ablutions should be made to the parts, in order to avoid any complicating inflammatory conditions. Then mercurial ointment on cotton or lint should be applied continually to the chancre. Throughout the course of gestation this antiseptis of the external genitals should be regularly followed.

It is important that the physician should have an accurate knowledge of the effect of the various preparations of mercury upon the pregnant woman, in order that he may adopt a proper treatment. There is no fact in syphilography more deeply engraved upon my mind than that of the utter futility of treating a pregnant syphilitic woman, and of endeavoring to prevent or render more mild the disease in the child, by the use of mercurial pills. I can look back, ten to twenty years ago, to many cases in which mothers thus treated were not at all benefited, often much inconvenienced and troubled, and in which no effect upon the syphilis in the child was produced. Many failures with the protoiodide in this direction convinced me of its feeble powers, and my clinical results find their explanation in the experiments of Welander.<sup>1</sup> This observer found that by mercurial inunctions and hypodermic injections the drug was rapidly absorbed by the mother and transmitted to the fœtus, but that when pills of the protoiodide were administered the absorption was very slow and the action very feeble, owing to the smallness in quantity of the mercury absorbed. Therefore, in general it is a waste of time to treat a syphilitic woman either by the protoiodide, by gray powder, blue pill, the tannate, or any other preparation which is swallowed in pill form. Further than this, disaster may follow such a course. Many a man has thus treated a pregnant syphilitic woman and innocently imagined that he was doing all in his power for her.

It is well, therefore, to institute a systematic inunction treatment with all the precautions and safeguards spoken of in the section upon this branch of the subject. No pains should be spared in watching the woman to learn that all goes well and that the therapeutic effect is being obtained. In this way course after course of inunction should be given, with proper intervals of rest, during the whole period of pregnancy. If the treatment is carefully administered and the general condition and surroundings of the woman are favorable, there will be no trouble in keeping on to the end.

In like manner, if admissible, hypodermic injections of sublimate will be found of especial benefit. They should be given for a week or two at a time, in the retro-trochanteric regions principally. One very great advantage of the inunction and of the injection methods is that the stomach—so prone to rebel—and the intestines are spared.

But it often happens that objections to these methods are offered, and

<sup>1</sup> "Récherches sur l'Absorption et sur l'Élimination du Mercure dans l'Organisme humain," *Annales de Derm. et de Syph.*, 1886, p. 412 et seq.

that the condition of the patient will not permit of their employment. On the principle that half a loaf is better than no bread, the physician may sometimes compromise matters and have the patient take a few inunctions for a time or a few injections, and then fill in the balance of the time by medicine given internally. He should make it very clear to the patient that if she can possibly use the inunctions or submit to the injections for short periods and at odd times, she will be much the gainer.

Internally, the mixture of mercury and iodide, the formula of which is to be found on p. 843, may be given if stomach ingestion is found to be the most acceptable method.

The foregoing considerations concern chiefly early and active syphilis, in which condition mercury is especially indicated. In the case of women in later periods of syphilis, who are either the subjects of repeated abortion or whose children show evidence of hereditary taint, iodide of potassium in good-sized and perhaps increasing doses, combined with mercury, should be given with proper intermissions during the whole pregnancy. Pregnant women in an advanced stage of syphilis are greatly benefited by the iodide alone, but particularly in combination with mercury. The embryos of these women of course have a more advanced form of syphilis, and these drugs given to the mother exert beneficial therapeutic effects upon the child she carries.

In this connection it is well to remember the teachings of the case of Moreau,<sup>1</sup> which was that of a woman who, after several successive pregnancies always ending in premature birth and death of the fœtus, in despair as to the cause was submitted to an active syphilitic treatment, and who thereafter gave birth to healthy children at full term.

As claimed by Dubois, Depaul, Moreau, Vidal de Cassis, and Putégnat, parents who procreate syphilitic children, even though they themselves may appear healthy and show no signs of the disease, should undergo a regular, methodical antisymphilitic treatment.

*Indirect Treatment by Means of the Milk of the Mother or of the Nurse.*—As early as 1699, Garnier proposed to treat syphilitic children by means of the milk of the mother or nurse, to whom mercury was being administered. This method is called "the indirect way of treating hereditary syphilis," and it has many advocates, and perhaps as many opponents. It is a subject which often arises in the practice of medicine, and is one concerning which few physicians have definite ideas.

The adoption of this treatment was really the outcome of the difficulties experienced in administering antisymphilitic treatment to young infants. The older physicians not only treated the mother or the nurse, but in the case of the absence or defection of either of these parties they caused the hair to be shaved off a female goat or ass, had the animal well rubbed with mercurial ointment, and then the child was made to nurse it, and thus simultaneously get sustenance and medication. Swediaur says that in one of the reigning families of Europe no child survived a certain age until this treatment was adopted. Though benefit was noted in many cases as following this treatment, it was claimed by some that no mercury, or only an insignificantly insufficient quantity, was conveyed by the milk, and that the seeming improvement in the child's condition was due to the auspicious course of its disease. Leaving aside the older analyses of milk

<sup>1</sup> Lancereaux, *Traité historique et pratique de la Syphilis*, Paris, 1873, p. 562.

from mercurialized women and animals, in some of which it was stated that mercury was found, and in others that it did not exist, we come to those of a later date. Thus, Kahler<sup>1</sup> resorted to very delicate electrolytic analysis of the milk of women in whom mercury had been used so thoroughly that existing syphilitic lesions had been cured, yet no trace of the drug could be found. Still, he states that in certain cases in which no mercury was given to the children improvement followed their nursing a mother who was taking that agent by inunction. This fact has been observed over a long stretch of years, and I have seen many striking instances of it. On the other hand, Klink<sup>2</sup> of Warsaw, with the aid of Professor Tudakowski, submitted such milk to very delicate and elaborate tests, and found in that fluid a small but unmistakable quantity of mercury. In Klink's case also the child had derived benefit from the mercurialized milk. On this subject Welander<sup>3</sup> says: "I have only made three observations on the elimination of mercury by the milk. A woman who had taken only ninety pills of the protoiodide had mercury in the urine as well as in the milk. The urine of her child, which she nursed, and had received no other treatment whatever, also contained mercury. To a woman who had no mercury in the urine an injection of the bichloride was administered and five days after I found mercury in the urine of her child. In another case mercury was found in the urine of a child each time after six experiments with bichloride injections given to its mother. These facts are in accord with the results of many other investigators, and they seem to prove conclusively that mercury may be conveyed to the child by its mercurialized mother's milk." The evidence obtained through chemical analysis by many competent observers is in striking accord with the results of clinical observation, and the combined knowledge I think proves the benefit—never, however, absolute—of the mercurialized milk of a syphilitic mother.

In all probability other conditions besides the mercury contained in the milk are involved in the child's improvement. Undoubtedly, the syphilitic woman's health and nutrition are improved by the systematic inunction-treatment which she receives, and as a consequence her milk is purer and more sustaining to the child than it would be without the treatment. She then gives a more competent milk, and dissolved in it is the remedy which the infant so sorely needs.

The practical deduction to be drawn from these facts, accumulated during a period of several hundred years, is that we should treat the syphilitic mother whenever we can, particularly by inunctions, not only for her own sake, but also for that of her child, for it benefits the one that receives and the one that gives.

We must not forget that in many cases syphilis is transmitted directly from an infected father to his offspring, and that the mother remains to all appearances free from the disease. The question, therefore, arises, What shall we do in the event of a non-syphilitic woman having a syphilitic child by paternal transmission? It will be found that some

<sup>1</sup> "Untersuchungen der Milch von Frauen während der Inunctionen," *Vierteljahr. für die Prak. Heilkunde*, vol. xxxii., 1875.

<sup>2</sup> "Untersuchungen über den Nachweis der Quecksilber in der Frauenmilch während einer Einreibungskur mit grauer Salbe," *Vierteljahr. für Derm. und Syphilis*, 1876, pp. 207 et seq.

<sup>3</sup> *Op. cit.*, p. 415.



of these mothers are thin, sickly-looking women, while others are well-developed and robust. In these cases it has been my practice, when there was difficulty in administering mercurials to the child, to explain the condition of affairs to the mother, and with her consent (which is, as a rule, readily gained) to try a tentative course of treatment upon her. When inunctions cannot be used, hypodermic injections may be given or the mixed treatment may be taken. The question of utility and of benefit will be settled in a week or two.

We may conclude, therefore, that the indirect treatment of hereditary syphilis by mercury should not be regarded as one of the standard methods, but rather as a resource to fall back upon, or as an adjuvant to be instituted in cases in which it is admissible or seems to offer probabilities of benefit.

*Indirect Administration of Iodide of Potassium to the Syphilitic Child by Means of the Milk of the Mother or Nurse.*—Not only is mercury administered to the syphilitic child by means of the milk, but several authors have adopted this method of employing iodide of potassium as the therapeutic agent. La Bourdette and Dumesnil,<sup>1</sup> many years ago, showed by quantitative analysis the presence of iodine in the milk of animals to whom the iodide of potassium had been administered. This observation was later confirmed by Schafer,<sup>2</sup> who found iodine in the milk of a woman two hours after the ingestion of 15 grains of the iodide. These results were fully confirmed by a number of experimenters, among whom was Welander,<sup>3</sup> who observed an iodic coryza and iodic eruption in a nursing infant whose mother was taking 15 grains of the iodide daily.

In clinical practice the indirect treatment with iodide of potassium does not possess a rich literature, but the reported results are certainly worthy of record and consideration. Lazansky<sup>4</sup> in Pick's clinic thus treated a four months' old child whose mother took 15 grains of the iodide daily. The eruption quickly left the child and the mother became healthier. Chemical analysis of the milk and of the infant's urine showed the presence of iodine. This observation is supported by the results obtained by Link,<sup>5</sup> who thus treated four cases in Ganghofer's clinic in Prague. In the first case, a child ten weeks old, having snuffles, general exanthem, and ulcers, was promptly benefited and cured of its visible lesions in thirty-three days. In the second case, a four-months'-old girl, with exanthematic symptoms, and bad diarrhœa, was relieved of her existing lesions in five weeks. The third case was that of a premature girl, who had two days after birth had a general exanthematic condition. During the ensuing fourteen days, in which the mother took 30 grains of the iodide daily, the child increased in weight, and its rash slowly vanished. In the fourth case, a child at

<sup>1</sup> "Du Passage de l'Iode par Assimilation digestive dans le Lait de quelques Mammifères," *Gazette des Hôpitaux*, 1856.

<sup>2</sup> "Aufsaugung und Ausscheidung der offic. Iodpräparate," *Zeitschrift der Wiener Aerzte*, 1859, No. 5.

<sup>3</sup> *Nordiskt Medicinskt Archiv*, t. vi. No. 31, 1874.

<sup>4</sup> "Ueber die therapeutische Verwendung von iodhaltiger Ammenmilch," *Vierteljahr. für Derm. und Syphilis*, 1878, pp. 43 et seq.

<sup>5</sup> "Ueber die Behandlung der Syphilis bei Säuglingen," *Prager med. Wochenschrift*, 1883, pp. 305 et seq.

nine weeks presented active symptoms of hereditary syphilis. For two weeks it was treated non-specifically and then it was subjected to the indirect treatment. At the end of five weeks its health and weight were improved and its rash had disappeared. Link thinks these results very gratifying, for the reason that the disease was active in the infants, and was accompanied with such complications as diarrhœa and stomatitis.

It is claimed by Stumpf<sup>1</sup> and others, on theoretical grounds, that the use of iodide of potassium in such cases is contraindicated, for the reason that it tends to diminish the quantity of the milk and to induce atrophy of the mammary glands. It is very probable that a prolonged course of the iodide will produce the effects claimed to result from this drug, but such will rarely be necessary in practice. This treatment, if it is adopted by any one, need not of necessity be very long continued, but its effects on mother and child should be carefully watched. If beneficial it may be used until the child is far enough along to do without treatment for some time or until it can bear direct treatment. Contraindicating conditions should cause its prompt rejection.

The indirect treatment of hereditary syphilis by means of the iodide is therefore a measure of reserve and utility, to be employed only in some cases when other methods are impracticable or temporarily contraindicated.

As in the chapter on the General Methodical Treatment of Syphilis I take the ground that in most cases iodide of potassium is powerless, and often harmful, it may seem inconsistent for me thus in a measure to recommend this drug for women and children. But it is well to remember that in some cases there seem to be two conditions to treat—namely, the essential syphilis and the symptoms—which are explainable only on the theory advanced by Finger,<sup>2</sup> that in addition to the syphilitic virus the system is poisoned by ptomaines or tissue-products which result from the action of the virus. Besides the symptoms already mentioned as being probably caused by tissue-products, it seems very probable, judging from clinical observation, that in pregnant syphilitic women and their children these morbid secretions are very often active and potent. At any rate, the theory seems rational, and it is an undisputed fact that in some of these cases the iodide acts favorably.

It is also necessary to emphasize the fact that the mixed treatment, either with an excess of the iodide or of mercury, is, as said before, very often a most valuable agent in the treatment of pregnant syphilitic women. Useful and efficacious before childbirth, it is also in some cases beneficial to the mother and also to the child. The indirect method, employing the mixed treatment, should be remembered by physicians in the category of inunctions and of iodide of potassium.

*The Treatment of the Syphilitic Infant.*—The treatment of the syphilitic infant is in many cases a question which necessitates great delicacy, tact, and prudence on the part of the physician, and in every case a good knowledge of the disease, of medicine in general, and of therapeutics is required. The subject can best be presented by a consideration of the

<sup>1</sup> "Ueber die Veränderungen der Milchsecretion unter dem Einflusse einiger Medicamente," *Deutsches Archiv für klin. Med.*, vol. xxx., 1881 and 1882, pp. 201 et seq.

<sup>2</sup> *Op. cit.*

condition of the infant from its birth onward. The first question to settle is when to begin to treat the child. So eminent an authority as Archambault<sup>1</sup> thinks that the offspring of a known syphilitic father or mother should be put upon treatment at once, even if it appears healthy and presents no visible syphilitic lesions. Should such a child present any evidence of cachexia, the prompt adoption of treatment is imperative. However, as it is not very uncommon for a syphilitic woman to beget, or a syphilitic father to procreate, a seemingly healthy child, which as it grows up may show no evidence of hereditary infection, it is always well, if medication is commenced very early, that it should not be too active or energetic. A baby may be puny at birth and not be syphilitic, but it is fair to assume that a puny baby whose father or mother is syphilitic is so far syphilitic itself that it needs the intervention of rational treatment.

It may be stated as a general rule that syphilitic infants who have a chance, even slender, for their life come into the world with little or no sign of their inheritance upon them. Therefore for a time important objective phenomena are wanting. Then in many cases the physician can get no information, for the reason that the parents may forget that they have had syphilis or they (one or both) conceal the fact, or, again, they may be ignorant of the possibility and danger of hereditary transmission. In hospitals we frequently see women who give birth to tainted children, but who can give no facts relating to the father from whom the disease had been derived. Then in infant and foundling asylums children in the very early latent period of syphilis are left for care, concerning whom no history whatever is obtainable. So that in private and in public practice the diagnosis of hereditary syphilis in the new-born is commonly very difficult, and ready knowledge and acumen on the part of the physician are very essential.

In private practice, in many cases where no data are volunteered by either father or mother as to their condition before the birth of the infant the physician's position is very delicate, and sometimes very trying. Under these circumstances, he should act with great prudence and tact, keeping his own counsel, but he should at once place the child upon proper treatment, and then await developments. Generally, the child's illness will cause the father or the mother to think of his or her previous condition, and then a ray of light may be shed. As a general rule, in this complication of affairs the physician had better, if necessary, approach the father on the subject of the child's disease, since he will commonly be found to be the guilty person, or his past history will be such that a suspicion of syphilis having been derived from him will in all probability not greatly shock or surprise him. In general, he will do very little in the way of recrimination of his wife, and will prefer to keep silent.

Before considering general methodical treatment, something should be said concerning the management of young infants and children thus infected. First, as to the nourishment. If possible, the child should be nursed by its mother, who should be subjected to proper treatment, and placed in such a condition that she can supply nutritious milk. If the mother cannot suckle her child, it must be put upon cow's milk properly sterilized, and care must be taken to sustain its nutrition in every

<sup>1</sup> "Traitement de la Syphilis infantile," *Journal de Médecine et Chirurgie pratiques*, June, 1878.



possible way. In no instance should a syphilitic child be put to the breast of a healthy woman. Though Diday has long advised and sanctioned such a course, the condemnation of it by all other authors is unanimous. On this subject I can with advantage quote the words of Grassi<sup>1</sup> on the responsibility of the physician concerning the employment of a wet-nurse for a syphilitic child. He says: "It is the peremptory duty of the parents to inform the wet-nurse of the danger she is exposing herself to. This is especially the duty of the physician, as there are cases on record in which such wet-nurses have infected their husbands, their children, and other persons in their neighborhood. But even if a wet-nurse knowingly contracted for such service in consideration of large pay, it would be the duty of the physician to prevent this, for individual liberty must be restricted as soon as others suffer from it: *Salus publica suprema lex esto.*" Fournier has also spoken emphatically in the same vein. If possible, a well-nourished wet-nurse should be obtained. This is usually a less difficult task than might be supposed, for syphilitic mothers can usually be found in infant asylums and in large public hospitals. In some rare cases, for various reasons, the urgency is very great, and parents are willing to make any sacrifice to save their child. On this subject Steiner<sup>2</sup> says "that a syphilitic child should not be given to a wet-nurse. I must, however, confess that there are exceptions to the rule. I myself have been obliged to allow this in certain cases where life could only be preserved by the employment of a wet-nurse. *But I never do this without informing the nurse of the danger she is likely to expose herself to.* If, thus warned, she is prepared to undergo the risk, I have at least done my duty as a man and as a physician." The foregoing so clearly brings out the necessities and duties in these cases that nothing remains to be added.

On the Continent the practice of suckling syphilitic children by means of a she-goat or she-ass has been in vogue from an early date, but it has not, to my knowledge, been employed in this country. In a recent brochure Bellaserra<sup>3</sup> strongly advocates the use of animals in nursing syphilitic infants, and he makes the suggestion that she-goats and she-asses should be kept ready for such use at maternity hospitals and at infant asylums. If this method is adopted in any case, due care must be taken that the quantity and quality of the milk shall be in keeping with that of the human female.

The general hygiene of the child should be upon as high a plane as possible. Hereditary syphilis, being accompanied with atrophy, wasting, and many debilitating influences, requires more than any other infantile disease every possible healthy surrounding and aid. Then stress should be laid upon the actual care of the infant. The physician should endeavor to bring intelligent antisepsis to its aid in every possible direction. The mouth, tongue, and nose should receive attention, and for this purpose there is nothing better than a solution of boric acid (10 to 20 grains

<sup>1</sup> "Un Appunto all' Articolo di Diday: Sulla Responsibilita del Medico verso il neonato e verso la Nutrice," *Giornale Ital. delle Mal. Ven. e delle Pelle*, vol. ii., 1868, pp. 233 et seq.

<sup>2</sup> "Zur Behandlung der Hereditären Syphilis," *Oester. Jahrbuch. für Pädiatrik*, 1870, N. F. 1, pp. 95 et seq.

<sup>3</sup> "Prophylaxia de la Sifilis en el Nifio y en la nodeyza por Medio de la lactencia Animal, particularmente en las Maternidades y Casas de expósitos," *Revista de Ciencias Medicas de Barcelona*, 1887, 5, pp. 129 et seq.

to the ounce). With this the nose, if snuffles are present, may be gently irrigated, and the mouth carefully washed three or four times a day. Great care should be exercised to prevent septic infection. The tissues of the young child, particularly when it is syphilitic, are very vulnerable to the inroads of pyogenic and septic cocci, which luxuriate in them. These gain access to the system through the skin and mucous membrane, also through the intestines, and probably through the lungs. Therefore, great care should be taken to heal up quickly any fissure, abrasion, or cut surface. Thus any lesion about the scalp, face, mouth, eyes, and anus or on any part of the body should be looked upon as a source of danger, and promptly healed. In very early days the navel should be carefully watched and kept in an aseptic condition by irrigations of carbolic-acid water, followed by drying and dusting with powdered boric acid or some other absorbent powder. Then, further, the anus and its folds should be looked after. Attention to the alimentary canal may perhaps restore that to a satisfactory condition, and thus rid the child of a serious source of danger.

As before stated, in most cases of hereditary syphilis in which the child is born alive there may be no evidence of its disease at birth or for some time after. But in some cases soon after birth syphilitic lesions are seen in the infant. The most precocious evidence of hereditary syphilis is the bullous eruption, and it is always the expression of profound systemic poisoning. This eruption brings up the question of the very earliest treatment of hereditary syphilis. For very young infants, as a rule, some mercurial salt in powder form, internally administered, is the one best borne and most commonly productive of good, if such is attainable. For this purpose many prefer calomel, and they administer it in doses of  $\frac{1}{8}$  to  $\frac{1}{3}$  grain three times daily for very young children. It is well to give a small dose to a very weakly child, and then to increase it as fast as possible. For well-nourished infants  $\frac{1}{8}$  or  $\frac{1}{2}$  grain may be given three times daily. Calomel can be rubbed up with a little sugar of milk, and the powder placed on the child's tongue before it is put to the breast. In case of diarrhoea, colic, or sleeplessness, a little Dover's powder may be added to the mercurial preparation which is to be used. When it is possible to administer them, adjuvant tonics should be combined with the mercurial. For this purpose the saccharated carbonate of iron is much praised by Steiner and other authorities in children's diseases. It is palatable and well borne by the stomach, and may often be employed with marked benefit, particularly in children who have reached their third or fourth month. Many years ago Monti<sup>1</sup> proposed the saccharated iodide of iron in the treatment of syphilis, either with or without the addition of calomel. It is a remedy which may be given with benefit when the child is six months or a year old, but considerable difficulty will be experienced in giving it to very young infants in whom it may also produce vomiting. Within a few years Monti<sup>2</sup> has proposed a combination of calomel and lactate of iron, which I have found of especial benefit in children three months and more old. The prescription is as follows:

<sup>1</sup> "Ueber die Behandlung der Angeborenen Lues mit Ferri iod. Saccharat," *Journal für Kinderheilkunde*, 1876, vol. ix. pp. 335 et seq.

<sup>2</sup> "Ueber ältere und Neuere Methoden der Behandlung der Angeborenen Lues," *Archiv für Kinderheilkunde*, vol. vi., 1885.

R. Hydrarg. chlor. mit.,	gr. jss ;
Ferri lactatis,	gr. v ;
Sacchari albi,	gr. xlv.—M.

Ft. in pulv. No. x.

From one to four of these powders may be given daily, according to the weight of the child.

Calomel may be given for a considerable time with benefit and without deranging the stomach and bowels. However, its action should be carefully watched, and if anæmia shows itself the drug should be discontinued.

Following a course of calomel powders it is well to allow an interruption in the specific treatment, during which the saccharated carbonate of iron may be given or the saccharated iodide of iron, according to the formula of Monti, as follows :

R. Ferri iodidi saccharat.,	gr. xv.
Sacchari albi,	gr. xxx.—M.

Ft. pulv. No. x.

One to three powders should be given daily, according to circumstances.

Gray powder (hydrargyrum cum cretâ) is also used by many. It is sometimes quite efficient in its action, and commonly it is less liable to produce gastro-intestinal reaction than any other mercurial. Its use is indicated in very weak infants with a tendency to great disturbance of the stomach and bowels. It is, however, not uniformly efficacious. It may be given in doses from  $\frac{1}{8}$  to  $\frac{1}{3}$  of a grain three times daily.

The protoiodide of mercury has been used in the treatment of hereditary syphilis with more or less benefit for many years. Bednar<sup>1</sup> used it largely in  $\frac{1}{8}$ - to  $\frac{1}{4}$ -grain doses, and considered it very efficient. Later experience has shown that in general these doses are too large, and are apt to be followed by bowel troubles and anæmia. Monti thinks that this salt is especially beneficial in the bone lesions of hereditary syphilis, and uses the following formula :

R. Hydrarg. iodidi virid.,	gr. jss ;
Ferri lactatis,	gr. iij ;
Sacchari albi,	gr. xlv.—M.

Ft. in pulv. No. x.

One to three powders may be given daily.

In very young children it is well, if the protoiodide is used, to begin with the dose of  $\frac{1}{20}$  grain, which may be increased according to indications. Though it is an active and efficient remedy in children, its use is commonly attended with colic and intestinal derangements, which necessitates the admixture of powdered opium or Dover's powder.

Henoch prefers the black oxide of mercury, according to the following formula :

<sup>1</sup> *Die Krankheiten der Neugeborenen und Säuglingen*, Wien, 1853.



R. Hydrarg. oxid. nigri,  
Sacchari albi,

gr. jss;  
gr. xlv.—M.

Ft. pulv. No. x.

One powder morning and evening.

Monti has found this preparation less efficient than calomel.

The tannate of mercury is well thought of by some authorities, and it will be found to be very prompt in its action, and to cause syphilitic lesions to disappear rapidly. It may be given in doses of  $\frac{1}{20}$  to  $\frac{1}{8}$  grain three times daily, according to the age and weight of the child.

I have recently seen a mild and efficient action follow the use of the thymolo acetate of mercury in two cases of hereditary syphilis, and I think that this preparation should be borne in mind, for it is capable of producing good results.

In administering these mercurial powders the physician should always be on the watch as to their action and as to the condition of the little patient. In general, interrupted courses of a month or six weeks' duration should be followed, during which the child should have plenty of fresh air and every conceivable hygienic benefit.

By many authors corrosive sublimate is held in high esteem in the treatment of hereditary syphilis. It is used chiefly in the very early weeks of life and throughout the child's first year. If used, it is best given in the form of Van Swieten's liquid in combination with a little milk. For very young children the dose of this liquid is 5 to 10 drops two or three times a day, which is to be increased considerably for older children.

Thiry of Brussels recommends a solution of corrosive sublimate in emulsion of bitter almonds as preferable to any other preparation. There can be no doubt that some benefit may result from this mercurial salt when taken by the mouth in some cases, but in my judgment it is far inferior to the salts already mentioned, and cannot be compared for certainty of effect with inunctions. In whatever form given, corrosive sublimate is exceedingly liable to derange the stomach and bowels; hence it is at best a very uncertain remedy. Given subcutaneously, it is frequently very efficient. It may be well to remark that most of the authors who recommend this agent by the mouth add as a rider to their remarks that it may be necessary also to employ inunctions simultaneously, or give the child in addition baths of corrosive sublimate.

Iodide of potassium has a rather limited sphere in the treatment of hereditary syphilis. It may be of benefit in bone, joint, and cerebral affections and in lesions of the eye and ear. On this subject Steiner,<sup>1</sup> who made comparative studies of the treatment of syphilis by mercury, by iodine, and by the expectant plan, says: "From my experiments on children I am convinced that iodine, as well as mercury, causes the symptoms of hereditary syphilis to disappear, yet with the important difference that this happens more slowly under the administration of iodine than of mercury. Whatever improvement is attained in days with mercury is not accomplished in weeks with iodine."

As already stated, the limits of employment of the iodide are restricted, and its use in children as in adults is attended by more or less severe

<sup>1</sup> *Op. cit.*

symptoms of iodism. In some children small doses produce prompt toxic effects, while in others saturation of the system may occur before untoward symptoms show themselves. The main symptoms of iodic derangement in children are—gastric and gastro-intestinal irritations, catarrh of the nasal mucous membrane, angina, headache, trembling, increased temperature, emaciation and weakness, and sometimes dermatitis of varying severity. These possible complications should be remembered by the physician. It should be mentioned that some physicians who recommend the iodide also state that it is well to combine its administration with inunctions. Monti makes the significant remark that the iodide is only suitable for cases in which an energetic treatment is not indicated, or where sublimate baths are used.

The dose of the iodide for very young infants is from  $\frac{1}{2}$  to 1 grain, well diluted, three times a day. For children of a year or older, 5 grains or more may be given three times daily.

The mixed treatment, however, is very efficient in many cases of hereditary syphilis, particularly of the bones and viscera, and in syphilitic subcutaneous tumors. My experience with the following formula, which I gave in my book<sup>1</sup> years ago has been uniformly favorable in the cases in which a combination treatment is indicated:

Ry. Hydrarg. chloridi corrosiv.,	gr. j-ij ;
Potassii iodidi,	3ss ;
Syrup. aurantii cort.,	
Aquæ,	āā. ʒij.—M.

For young children the dose is 5 to 10 drops (always well diluted) three times a day. This preparation is practically the same as Gibert's syrup, which is much employed by French physicians.

In addition to this treatment by the mouth, other methods of using mercury are employed in the treatment of hereditary syphilis. As a general rule, mercury by stomach ingestion is to be recommended for the first year of the child's life. As it grows older we can resort to mercurial inunctions. This method of treatment is as efficient for the infant and child as for the adult, and its administration to the former requires all the care and circumspection laid down as necessary for the latter. (See chapter on Inunctions.) There is a marked lack of unanimity of opinion in the minds of medical men as to the value and usefulness of inunctions in hereditary syphilis. Thus we find their use strongly deprecated by Widerhofer,<sup>2</sup> who says that they produce bad results, and that he has seen fatal bleeding from the ears and marasmus produced by them, while, on the other hand, Simon<sup>3</sup> and many others speak warmly in their praise. The truth is, that much benefit may be derived from their use, provided due caution and care are exercised. The inunctions should be given daily, using 15 or 20 grains of the strong mercurial ointment, going over the whole body after the plan already described. At the same time, the child should

<sup>1</sup> *Op. cit.*, 1876.

<sup>2</sup> "Ueber Syphilis und deren Behandlung," *Allg. Wien. med. Zeitung*, 1886, Nos. 30 and 31.

<sup>3</sup> "De la Syphilis infantile congenitale: de son Traitement comparé avec celui de la Syphilis des Adultes," *Rev. mens. des Maladies de l'Enfance*, June, 1886, pp. 245 et seq.

receive an iron tonic, and perhaps some cod-liver oil. Should signs of debility, restlessness, and sleeplessness, of weakness or anæmia, show themselves, the inunctions should be stopped at once. In some cases, particularly in children a year or more old, the local use of mercurial ointment or of mercurial plasters is productive of much benefit. The ointment may be spread upon cotton flannel or buckskin, and bound around the child's body. By this means mercury is absorbed, and frequently benefit is noted, particularly in cases of enlarged liver or spleen. Mercurial inunctions and plasters are very effective in many cases of hereditary bone and joint disease. In intracranial syphilis, meningeal inflammation, gummy tumors, and hydrocephalus internus, this method, particularly when combined with iodide of potassium given internally, is often productive of surprising results. The quantity of mercurial ointment (50 per cent.) for each inunction is about 15 grains for a young child, and this quantity may be increased to 30 grains, provided there are no contraindicating conditions, and that improvement is noted. Elsenberg in a recent essay<sup>1</sup> advises full doses of the iodide internally, and the inunctions to be pushed until slight gingivitis or salivation is produced; then the dose should be diminished or the treatment temporarily stopped. It may be necessary and expedient thus to push this combination treatment, but it should only be done when the case is under the careful observation of the physician.

Widerhofer prefers an ointment of red precipitate (1 : 100 of lanolin) to mercurial ointment for children. About the head a white precipitate ointment (1 drachm to 1 ounce of vaseline) will be found of decided benefit, and in the case of infants with very fastidious parents this ointment may take the place of blue ointment. White precipitate is readily absorbed by the adult or infant integument.

Hypodermic injections of mercurial preparations have long been used in the treatment of hereditary syphilis. Monti<sup>2</sup> was one of the first experimenters with this method, and he employed it in cases of intestinal troubles, of laryngitis, and where a quick result was necessary. His doses of the sublimate thus used were from  $\frac{1}{32}$  to  $\frac{1}{8}$  of a grain. In children under a year old the smallest dose is used; in those under five years of age  $\frac{1}{24}$  of a grain; and in large, well-developed children  $\frac{1}{16}$  of a grain may be injected. My colleague, Professor Jacobi, informs me that he has used these injections in very young infants and in older ones for many years in severe cases when a prompt and efficient action was necessary. He has seen benefit in very bad cases of children recently born. The resulting nodosities are said to be not painful, to cause little if any inconvenience, and to disappear promptly. I can well understand that in some private and hospital cases this method may be employed with signal success when the child is fully under the control of the physician. But it should always be employed with care and watchfulness. Monti, Smirnoff, and others advocate the use of calomel injections, while others, again, employ the albuminate, the peptonate, and other preparations of mercury. No preparation of mercury, however, is superior to the sublimate for this purpose.

<sup>1</sup> "Die Behandlung der Syphilis," *Wiener Klinik*, Aug. and Sept., 1891, pp. 277 et seq.

<sup>2</sup> "Beobachtungen über die Behandlung der Syphilis congenita et acquisita mittelst subcutanen sublimat Injectionen," *Jahrb. für Kinderheilkunde*, 1869, 4 Heft.



This treatment will never, to my mind, be a success in dispensaries and clinics. Moncorvo and Ferreira<sup>1</sup> in an out-door clinic at Rio Janeiro used gray oil, calomel, salicylate of mercury, and yellow oxide on forty-seven children from thirty-eight days to fourteen years old, taking the retro-trochanteric regions for the sites of injection. They found that the sublimate and gray oil were easily borne and most efficient. But we find at the end of nearly every clinical history these significant words: "Le malade ne revient plus au service," "nous avons perdu de vue cette fillette." In my experience in out-door services, as a rule, patients submit to one or two hypodermic injections of mercurials, and perhaps more, and then they disappear.

Baths of corrosive sublimate are frequently of great benefit in the treatment of hereditary syphilis, and it is important that the physician should know their scope and their limitations. They should never be relied upon as a methodical treatment, though Cassel<sup>2</sup> claims that by the use of from twelve to thirty-six baths he has cured obstinate cases of bone-lesions, sometimes with the aid of calomel. These baths are particularly indicated in the cases of the bullous syphilide, of syphilitic roseola, of papular syphilides, condylomata about the genitals, and in cases in which there are complicating ulcerations. In some children with a thin, atrophic skin, icterus, and enlarged spleen they may produce benefit. The quantity, as stated by Elsenberg,<sup>3</sup> will be found to be beneficial. Thus  $7\frac{1}{2}$  to 30 grains of sublimate, according to the age and size of the child, with an equal quantity of chloride of ammonium, dissolved in a glass of hot water, should be added to 7 or 8 gallons of warm water. The child should stay in this from five to ten minutes, and then should be wrapped up warmly and put to bed. If erythema follows this treatment, the surface should be dusted with infant powder. But if the reaction is severe and persistent, it may be necessary to discontinue the baths. The suitability of the treatment may be ascertained after three or four baths. If the general condition of the child and its lesions are benefited, they may be kept up. But any signs of resulting depression, weakness, sleeplessness, and refusal of food should lead to their discontinuance. The baths may be given every second day, or perhaps every third or fourth day. Though some authors recommend this method of treatment for very young infants, as a rule it will be found of most service in children from one to three years old. Iodide-of-potassium baths have been used, but no one has claimed to have obtained conspicuously brilliant results.

Local applications to the lesions of hereditary syphilis are similar to those used in the acquired form of the disease. The ulcers and encrusted surfaces left by the bullous syphilide and other eruptions of an ulcerative character should first be washed with a 1 or 2 per cent. carbolic solution, and then dressed with the following:

R <sub>y</sub> . Zinci oxidi,	
Pulv. amyli,	āā. ʒij ;
Hydrarg. chloridi mite,	ʒss-ʒj ;
Vasellini,	ʒss.—M.

<sup>1</sup> "Du Traitement de la Syphilis infantile par les Injections souscutanées de Sels mercurielles," *Revue mensuelle des Mal. de l'Enfance*, June and July, 1891.

<sup>2</sup> "Beiträge zur Hereditären Syphilis, besonders der Knochenkrankungen bei desselben," *Archiv für Kinderheilkunde*, 1885, Bd. 6, pp. 17 et seq. <sup>3</sup> *Op. cit.*, pp. 244, 277.

This ointment may be used for fissures about the mouth, nose, and anus. If a stimulant is admissible, 10 drops of carbolic acid may be added to each ounce of ointment.

White precipitate ointment and a combination of protoiodide of mercury and cold cream (10 to 20 grains to the ounce) may be useful in scaling papular eruptions, particularly of the palms and soles.

Rhinitis may be treated by the use of dilute Dobell's solution, injected slowly and carefully into the nostrils once or twice a day. This may be followed by the similar application of a solution of nitrate of silver ( $\frac{1}{2}$  to 1 grain to the ounce of water). In some cases a mild solution of boric acid or of borax is beneficial in removing mucus and crusts. Mild solutions of nitrate of silver are necessary for mouth and lingual ulcerations. Condylomata lata of the genitals should be kept clean and dry, and should be dusted with a powder like the following :

R̄. Hydrarg. chloridi mite,	ʒiiss ;
Pulv. amyli,	ʒj.—M.

If these lesions have become hypertrophic, they may be carefully touched with a solution of nitrate of silver (20 grains to the ounce), or with the ordinary acetic acid, or half-strength carbolic acid. When stimulating applications are made to these lesions, great care should be taken to prevent inflammatory reaction.

Bone, joint, and fascial lesions should be treated by plasters formed of strong mercurial ointment and Lassar's paste, of each equal quantities. In the management of hereditary ocular and aural affections, besides an energetic internal treatment, such local measures are necessary as may be indicated by the condition present.

In general, the treatment of acquired syphilis in infants and young children is the same as that given for the hereditary form of the disease. In acquired syphilis of the young the physician has less trouble, for he usually is not confronted with the atrophic condition and the tendency to marasmus which are so common in the hereditary disease.

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## CHAPTER LXXXVII.

### LESIONS OF THE PLACENTA.

OUR knowledge of the effects of syphilis upon the placenta is still incomplete in many particulars. Previous to the publication of Virchow's lectures on tumors the subject was little understood, and its literature consisted only of a number of papers by various authors, in none of which was there any approach to full and scientific investigation. In 1873, however, Ernst Fränkel<sup>1</sup> published an elaborate article, reviewing

<sup>1</sup> "Ueber Placentar Syphilis," *Arch. f. Gynäk.*, Berl. v., 1-54, 1873.

the cases which had already appeared and giving the results of his own careful studies. An abstract of his paper will give a better idea of the subject than it is possible to offer in any other manner.

Fränkel believes that our want of knowledge of placental syphilis has been due in a measure to the attempt to include all cases under a single form, and that the portion of the placenta first affected must vary according as the father is alone syphilitic, and according as the mother contracted syphilis before conception or shortly after; and finally, that the foetus can be but little, if at all, affected if the mother contracts the disease late in pregnancy.

Virchow admits two forms of placental affection: endometritis decid-  
ualis; endometritis placentaris.

To these Fränkel adds a third: disease of the villous portion of the foetal placenta.

Fränkel founds his conclusions on the examination of over one hundred placentaë, including those of stillbirths, those of abortion, and those of mothers having recent or old syphilis. The histories of the father and mother were obtained whenever possible, and a record of the macroscopic and microscopic appearances was kept. The post-mortem examinations of the foetus were made by Prof. Waldeyer and his assistant.

He groups his cases into the following classes:

A. Disease of the villi of the foetal placenta.

B. Mixed form of placental disease, the disease of the villi encroaching upon the adjacent portions of the placenta materna.

C. Disease of the foetus only, without involvement of the placenta.

D. Primary disease of the placenta materna (endometritis placentaris grummosa).

The characteristic lesions of the placenta are changes in volume, weight and consistency, and, microscopically, the thick, plump form of the foetal villousities, which is due to the filling-up of the villous spaces with an abundant proliferation of moderately-sized cells proceeding from the blood-vessels, complicated with a proliferation of the cell-contents of the villi. Obliteration of the blood-vessels, and, finally, complete destruction of the villi, ensue. This affection may appropriately be called "Deforming Proliferation of Granulation-cells of the Placental Villi."

The following is a more detailed description of the above changes:

*Macroscopic Appearances.*—Increased size and weight (up to 1000 grammes) of the placenta, in strong contrast to the slight development of the foetus.

*Closer and firmer* texture of the placental tissue, yet differing from that of old extravasations of blood and fibrinous nodules. Color, pale yellowish-gray, resembling gray nerve-matter: this color was uniformly diffused in some cases; in others it was circumscribed in larger or smaller wedge-shaped processes, extending from the uterine surface toward the foetus. A point of special importance was the constant marked opacity of this abnormally colored portion of the placenta, especially noticeable in the circumscribed form. In this latter case the healthy villous tissue which lay between these portions was markedly hyperæmic and livid in its color near the transitional portion. Old and recent extravasations of blood in all stages, from organized fibrin to cysts of dark grumous blood, were also found.



The *uterine surface* of the *placenta* had indistinct, faded, patchwork appearances, which were due to opacity and thickening of the decidua covering. The color was often yellowish-gray. Immediately beneath these spots lay the wedge-shaped processes or areas above referred to, and when the latter extended to the foetal surface they also appeared of a yellowish color through the chorial covering.

The *amnion* and *chorion* were thickened and rendered opaque by deposits of finely granular masses, and they were adherent to each other in spots which were occasionally the seat of extravasated blood. The umbilical arteries were only once atheromatous to any extent; their intima was colored yellow, fatty, and thickened; this change, however, extended but a short distance from the placenta toward the fetus. On the foetal surface of the placenta, in many cases, were numerous miliary whitish nodules about the size of a hempseed, which closely followed the course of the vessels, and were simple hyperplasia of the connective tissue of the chorion.

*Microscopic Appearances.*—In preparing specimens for the microscope it was first noticed that the villi of the changed placenta required much more teasing and pulling apart than usual. They appeared thickened and opaque even to the naked eye, and under a low power of the microscope it was evident that they were swollen, plump-looking, irregular in their form, and bulbous. Their ends were enlarged into knob-like processes, and the branches were irregularly formed. Their normal transparency had entirely disappeared. They were filled with round and spindle-shaped, occasionally polygonal, small and moderate-sized cells, which were finely granular and contained one or two, and sometimes three nuclei. These cells were especially abundant in the centre of the villous spaces along the axis where the vessels usually take their course. In the villous trunks and branches the spindle-shaped cells predominated; in the ends of the villi, the round cells. Many of these cells were undergoing fatty degeneration, and the villous space was often filled by fatty and molecular detritus. The blood-vessels of the villi were sometimes completely obliterated, often circularly compressed, while, again, no traces of them could be found.

The epithelium of these villi was often wholly wanting; when present, it was denser than usual, its cells strongly granular and opaque. In one case the change was confined to the epithelium alone, while the villous space was swollen by oedematous transudation from the dilated villous blood-vessels.

When healthy places still existed in these placentæ, the normal villi were usually found near the foetal surface, but even these had a stroma rich in cells, which at the same time exhibited numerous connective-tissue fibres. Their vessels were dilated, tortuous, very full, and ruptured in spots.

The most frequent complication of this change in the villi was extravasation of blood, which was either superficial or deep-seated, and which occurred in streaks along the borders of the vessels or oftener still in the form of sharply-defined, firm nodules which extended to one of the placental surfaces. The exuded blood exhibited the most varied transitional stages; the enclosed villi were atrophied and fatty and degenerated into fibrous tissue.

In explanation of the origin and course of these changes, Fränkel states: Owing to the irritation caused by syphilis, proliferation, in a greater or less number of villi, begins in the cells, which, in the normal stroma of the villi, are only sparingly found. Their nuclei, and still later the cells themselves, undergo manifold division; and the increase in number of the cells is attended by an increase in their size. This proliferation is chiefly seated about the vessels of the villi and about the deeper ones of the parenchyma, as well as around the more superficial and also about the fine capillary network lying directly beneath the epithelium.

Homologous products arise in every tissue of the villus in consequence of this hyperplasia,—cell-proliferation of connective tissue in the stroma, epithelial proliferation in the epithelial covering. The cell-proliferation causes compression of the vessels, interferes with the circulation, and finally leads to thickening of their walls and obliteration of the vessels themselves. The villi themselves are filled up with cells, become hyper-distended, plump, and thickened. The vascular spaces into which they dip become filled up and narrowed, and in the most advanced stage they entirely disappear. By this means and by the proliferation and thickening of the epithelial covering, the interchanges between the maternal and foetal blood is interfered with, and finally is wholly obstructed. The villi, having lost their function, undergo fatty degeneration. The cells of the stroma and epithelium become filled with fat-globules and finally break down into granular matter.

If the process is diffuse and continuous over the whole placenta, the foetus has in the mean time perished; if limited to circumscribed foci, it may have continued to live. In the latter case the degeneration frequently appears to have advanced from the uterine toward the foetal surface; the contrary, however, has been noted. The relatively healthy portions of the placenta between the diseased parts are the seat of deep congestion; their blood-vessels are dilated and gorged with blood. Extravasations of blood in all stages of retrograde change occur, and now and then connective tissue formation in the interstitial tissue is super-added. Thickening of the intima of the umbilical vessels has been found but once by Fränkel, who considers it the result of the resistance met with by the circulation in the deformed and compressed villi, and not a truly syphilitic lesion. Although this process might be considered a chronic inflammation or one due to new formation of granulation-tissue, yet, on the whole, it must be conceded that it begins as, and runs the course of, a chronic inflammatory process.

The reasons for calling this lesion syphilitic are—

1. It was found in all of Fränkel's cases in which autopsies showed the existence of syphilitic lesions of the bones in the foetus.

2. The proof of the existence of syphilis in the parents in many cases.

3. That this lesion was not due to the death of the foetus is shown by its existence in several cases in which the foetus was living.

4. Absence of this lesion in every other case of diseased placenta ever examined by Fränkel.

5. Club-shaped hypertrophy and cell-infiltration are constant accompaniments of syphilis.

**Predisposing Causes.**—It appears that this condition of the villi is developed, even if the health of the mother is in a fair condition at the time of conception, and that it is certainly due to a direct transfer of the paternal syphilis to the foetus, as shown by the fact that its almost exclusive seat is in the foetal portion of the placenta, the maternal portion not always presenting characteristic appearances.

It may be objected that the ovum may have been infected through diseased ovaries on the part of the mother, without any lesion of the remainder of the genital tract. To this it is to be said:

1. Syphilitic disease of the ovaries rarely occurs.

2. In Fränkel's case V. the disease existed in the foetal placenta, yet post-mortem examination of the mother failed to reveal any ovarian disease.

3. In case XVI., that of a markedly syphilitic child, villous degeneration was present, together with gummous degeneration of the adjoining maternal tissues, and yet the decidual covering of the convex surface of the placenta was not involved—a portion which by Winkler is considered "the great highway" from the mother to the foetus through the placenta.

Fränkel next inquires whether the origin, progress, and course of the disease can be inferred by reasoning from the exclusive seat of the syphilitic affection in the foetus and foetal portion of the placenta, taken in connection with the history of the case. Of 17 mothers, 14 were free from disease at and before their confinement; 1 died, the autopsy revealing no syphilitic lesion; 2 mothers became diseased, 1 on the fifth day, the other during the fourth week after confinement. The lesions in the mothers before confinement were: in 1, condylomata lata; in 1, psoriasis at time of confinement, the chancre having been acquired in the second month of pregnancy; in 1, syphilis denied, but glandular lesions afforded strong suspicion.

Fränkel relates one case in which the maternal portion of the placenta was primarily affected. This he calls "primary disease of the placenta materna" (endometritis placentaris gummosa). The case reads as follows: Bertha B—— has suffered since youth with eruptions and suppurating glandular enlargements. Has marked leucorrhœa; was never under syphilitic treatment. Husband not syphilitic. Now has swollen post-cervical glands and pigment-spots on forehead. Has had five children in five years; one macerated foetus at eight months; one born living which died at the age of five weeks with ulcers, etc.; third and fourth, abortions in early months; fifth, child born at eight months, breathed feebly and died in half an hour. Autopsy of fifth child showed infant atrophic, general induration, especially of lungs, liver, and spleen. Spleen very large. Osteochondritis syphilitica present. Placenta weighed 480 grammes, of a brownish-red color; its diameter 16 and 15 cms.; thickness 1.3 cm.; cord normal. Convex surface of placenta covered by coagula; markings of lobuli obliterated through thickening of placenta materna. Vertical section showed yellowish-gray spots or nodules of the placenta materna, which seemed continuous and inseparable from the foetal placenta.

Under the microscope decidua showed slight and localized fatty degeneration, while the thickened portions were the seat of cell-pro-



liferation. The nodules were composed of connective tissue, studded with granulation-cells, and their interior contained finely granular detritus, but no normal villi. The villi are found between them and compressed by them; they are atrophied, devoid of blood-vessels, very fatty, and calcified. The foetus had visceral and bone syphilis, and the mother suffered with syphilis before conception; the direct influence of the disease in the mother upon the placenta is apparent. In the previous cases referred to the villi were the seat of the disease, while here it was the maternal placenta.

In all the seven cases reported up to the present time of endometritis placentaris gummosa, the mothers presented well-marked symptoms of syphilis, but Fränkel states that he has met with cases in which the syphilitic mother had a healthy placenta. He thinks that in these latter cases the disease circulates through the blood without leaving any trace of it at any point, while in other instances it is localized in the endometrium and is then transmitted to the foetus.

That syphilitic endometritis occurs is beyond question; it only remains to prove that this endometritis decidua or placentaris gummosa recurs every time that an abortion takes place in the same woman. In this case the fact of local transmission would be established, and local treatment of the uterine cavity would be demanded as well as general constitutional treatment.

The influence upon the foetus of placental disease is of course prejudicial. In all seven cases the infants were premature; six were already macerated, and one, though born alive, was so atrophic that it died soon after birth.

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# PROGRAMME

BOSTON, FRIDAY, MAY 1

LOCAL COMMITTEE: Drs. Burrell, Munro, Lund, Porter, and Greenough

- 8.45 A.M. *Members will assemble at the Hotel Touraine (corner Tremont and Boylston Streets) and walk to the Massachusetts General Hospital, Blossom Street, West End.*
- 9 A.M. *Massachusetts General Hospital, Bigelow Amphitheatre.* DR. S. J. MIXTER (by invitation), DR. SCUDDER, DR. MUMFORD, DR. PORTER, DR. CODMAN, DR. GREENOUGH: Operations and the exhibition of cases.
- 11 A.M. *Intermission of fifteen minutes.*
- 11.15 A.M. DR. SCUDDER will show cases of pyloric stenosis in infants, after operation (lantern slides); the transperitoneal approach to tumors of the urinary bladder.  
 DR. MUMFORD: Excision of the jaw; peripheral nerve surgery.  
 DR. PORTER: Peripheral nerve surgery; keloid of face; cancer of rectum; X-ray burns.  
 DR. CODMAN: Duodenal stasis.  
 DR. GREENOUGH: Plastic of the breast; pathology of non-malignant breast disease.  
 DR. J. E. GOLDTHWAIT (by invitation): Anatomical considerations of surgical interest regarding the shoulder joint.  
 DR. J. H. WRIGHT (by invitation): The importance of blood plates in haemostasis.  
 DR. FARRAR COBB (by invitation): Haematogenous septic kidneys.  
 DR. OSCAR RICHARDSON (by invitation): The status lymphaticus.  
 DR. LINCOLN DAVIS (by invitation): Bladder tumors.  
 DR. H. F. HARTWELL (by invitation): Vaccine treatment of gonorrheal joints.  
 DR. R. H. FITZ (by invitation): Address.
- 1 P.M. *Luncheon in the Treadwell Library.*
- 2.30 P.M. *Automobile drive to the Harvard Medical School, Longwood and Huntington Avenues.*
- 3 P.M. *Harvard Medical School, Physiological Laboratory.* DR. W. T. PORTER (by invitation): Remarks on vaso-motor phenomena in surgical shock.
- 3.30 P.M. DR. W. B. CANNON (by invitation): Demonstration of experiments in the physiology of the digestive apparatus.
- 4 P.M. DR. SAMUEL ROBINSON (by invitation): Positive pressure apparatus for lung surgery.
- 4.30 P.M. *Museum of Surgical Pathology.* DR. E. H. NICHOLS: Demonstration.
- 5 P.M. *Laboratory of Surgical Research.* DR. J. C. HUBBARD (by invitation): Demonstration. *Library of the Division of Surgery. Afternoon Tea.*
- 7.30 P.M. *Dinner and semi-annual meeting at the Union Club, 8 Park Street.*

## SATURDAY, MAY 2

- 9.30 A.M. *Boston City Hospital, Harrison and Massachusetts Avenues (South End), Surgical Amphitheatre.* DR. BURRELL, DR. LUND, DR. NICHOLS, DR. F. S. WATSON (by invitation): Operations and the demonstration of cases.  
 DR. NICHOLS: Osteomyelitis and arthritis.  
 DR. LUND: Congenital cystic kidney and liver; carcinoma of stomach; skin grafting in bone cavities.  
 DR. WATSON (by invitation): Prostatectomy.  
 DR. COTTON (by invitation): Bone surgery; plastic operation for axillary contraction.  
 DR. HUBBARD (by invitation): Arterio-venous anastomosis for senile gangrene.
- 12 M. *Pathological Laboratory.* DR. F. B. MALLORY (by invitation): Micro-photographs illustrating the pathology of certain tumors; the differential staining of the fibrils in tumors.  
 DR. G. H. MONKS (by invitation): Demonstration on the cadaver: (a) Intestinal localization. (b) Operation for cancer of the tongue.
- 1 P.M. *Luncheon in the Hospital.*
- 2.30 P.M. *Automobile drive to the Carney Hospital, Dorchester Street, South Boston.*
- 3 P.M. *Carney Hospital Operating Room.* DR. MUNRO and DR. J. T. BOTTOMLY (by invitation): Operations and the demonstration of cases.

*At 8 P.M. members going to the American Surgical Association meeting in Richmond may take the Shore Line train from the South Station or Back Bay Station, as previously announced by a special circular.*

JAMES G. MUMFORD, Secretary, 29 Commonwealth Avenue, Boston







